UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
999 18th STREET - SUITE 500
DENVER, COLORADO 80202-2466

Ref: 8EPR-SR

MEMORANDUM

SUBJECT: Five-year Review for the Sand Creek Industrial Superfund Site

TO: Max H. Dodson
Assistant Regional Administrator
Ecosystems Protection and Remediation

FROM: Armando Saenz
Remedial Project Manager

Please find attached the Second Five-year Review Report for the Sand Creek Industrial Superfund Site (Site). The five-year review was conducted from July through mid-September 2000. The purpose of this five-year review was to determine whether the remedy at a Site is protective of human health and the environment.

The review was required by statute and consisted of the following activities: a review of relevant documents; interviews with representatives of the operations contractor and the Colorado Department of Public Health and the Environment; review of applicable or relevant and appropriate requirements and Operation & Maintenance data; and, site inspections.

The results of the five-year review indicate that the remedy implemented at the Site is expected to be protective of human health and the environment. Overall, the landfill cover and landfill gas extraction systems are operating and functioning as designed. Groundwater monitoring data suggests that the contaminated groundwater underlying the Site has remained within Site boundaries. A few deficiencies that do not immediately impact the protectiveness of the remedy were identified. I recommend that you accept the Second Five-year Review for the Site as described in the attached report.

Attachment

Five-Year Review Report

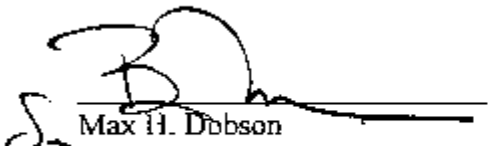
Second Five-Year Review Report
for
Sand Creek Industrial Superfund Site
Denver, Denver County, Colorado
And
Commerce City, Adams County, Colorado

September 2000

Prepared By:

REGION VIII
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
DENVER, COLORADO

Approved by:



Max H. Dobson
Assistant Regional Administrator
Office of Ecosystems Protection
and Remediation

Date

9/07/00

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List of Acronyms

ARARS	Applicable or Relevant and Appropriate Requirements
CDH	Colorado Department of Health (now CDPHE)
CDPHE	Colorado Department of Public Health & Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
ECI	Environmental Consultants Incorporated
GAC	Granular Activated Carbon
GETS	Groundwater Extraction and Treatment System
GPM	Gallons Per Minute
HASP	Health and Safety Plan
MCLs	Maximum Contaminant Levels
MSL	Mean Sea Level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	Operation and Maintenance
OUs	Operable Units
RALs	Risk Action Levels
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SSC	Superfund State Contract
USACE	U.S. Army Corps of Engineers
VOCs	Volatile Organic Compounds

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Executive Summary

EPA Region 8 has conducted a second five-year review of the remedial actions implemented at the Sand Creek Industrial Superfund Site (Site) located in Denver and Adams Counties, Colorado. The review was conducted from July through mid-September 2000. The results of the five-year review indicate that the remedy is expected to be protective of human health and the environment. Overall, the landfill cover and landfill gas extraction systems are operating and functioning as designed. Groundwater monitoring data suggests that the contaminated groundwater underlying the Site has remained within site boundaries. A few deficiencies that do not immediately impact the protectiveness of the remedy were identified.

The review of system operations included the only Operable Units (OUs) requiring Operation and Maintenance: OUs 3/6 (i.e. landfill) and OU 4 (i.e. site-wide groundwater). OUs 1, 2 and 5 are complete and protective of human health and the environment.

The remedy at OUs 3/6 is expected to be protective of human health and the environment. The landfill cover was found to be in good condition. No significant effects of burrowing animals and erosion were observed. The soil cover was thorough and abundant. The security chain and lock on the gate were cut on three different occasions. More aggressive oversight by the Potentially Responsible Parties' contractor will be needed. Repair of damage to the perimeter fence surrounding the landfill is scheduled for completion by the end of the year.

The landfill gas extraction system is being operated on a relatively constant basis, except for periodic shutdowns to facilitate routine maintenance activities. Low points in sub-header lines caused by differential landfill settlement are restricting drainage from the sub-headers to the condensate sumps, thereby creating intermittent gas flow blockage in the system (not significant enough to cause automatic shutdown). Adjustments have been made, but the problem will be further addressed by the end of the year.

The remedy at OU 4 is expected to be protective of human health and the environment. Groundwater sampling data suggests that the contaminated groundwater underlying the Site has remained within site boundaries. One well northeast of and within the Site contained contaminant concentrations above remediation goals. At this time, the contamination is thought to be from another source. EPA and CDPHE will be closely looking at the recently completed groundwater remedy at the adjacent Chemical Sales Company Superfund Site to determine the potential impact, if any, on the well. The area is served by a municipal water supply.

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Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name *(from WasteLAN)*: Sand Creek Industrial Superfund Site		
EPA ID *(from WasteLAN)*: COD980717953		
Region: 8	**State:** CO	**City/County:** Commerce City/Adams County

SITE STATUS	
NPL status: ☐ Final ✖ Deleted ☐ Other (specify)	
Remediation status (choose all that apply): ☐ Under Construction ✖ Operating ☐ Complete	
Multiple OUs? ✖ YES ☐ NO	**Construction completion date:** September 29, 1994
Has site been put into reuse? ☐ YES ✖ NO	

REVIEW STATUS	
Reviewing agency: ✖ EPA ☐ State ☐ Tribe ☐ Other Federal Agency	
Author name: Armando Saenz	
Author title: Remedial Project Manager	**Author affiliation:** EPA Region 8
Review period: July 2000 to September 2000	
Date(s) of site inspection: 2/16/2000, 9/11/2000	
Type of review: ✖ Statutory ☐ Policy (☐ Post-SARA ☐ Pre-Sara ☐ NPL-Removal only ☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead ☐ Regional Discretion)	
Review number: ☐ 1(first) ✖ 2 (second) ☐ 3 (third) ☐ Other (specify)	
Triggering action: ☐ Actual RA Onsite Construction at OU # ___ ☐ Actual RA Start at OU# ___ ☐ Construction Completion ✖ Previous Five-Year Review Report ☐ Other (specify)	
Triggering action date *(from WasteLAN)*: 9/20/95	
Due date *(five years after triggering action date)*: 9/20/00	

Five-Year Review Summary Form

Deficiencies:

Four general deficiencies were identified:

- Low points in sub-header lines of the landfill extraction system caused by differential settlement.
- Damage to perimeter fence surrounding landfill.
- Security chain and lock on landfill gate cut on three different occasions.
- One well northeast of and within the Site contained contaminant concentrations above remediation goals.

None of these deficiencies currently cause the remedy to be not protective.

Recommendations and Follow-up Actions:

With EPA oversight, the corresponding recommendations/follow-up actions are as follows:

- Responsible parties via KRW Consulting will need to locate the partial blockage and make necessary adjustments/repairs by December 31, 2000.
- Responsible parties via KRW Consulting will need to repair fence by October 31, 2000.
- Responsible parties via KRW Consulting will need to oversee the gates more aggressively till December 31, 2000 at which time, normal oversight can continue.
- CDPHE and EPA will need to look for the potential impact, if any, of the construction completion and operation of the adjacent Chemical Sales groundwater remedy on the contaminated well. After three groundwater sampling events, CDPHE and EPA will convene to discuss results and options for action for the well. It should be noted that the area is served by a municipal water supply.

Protectiveness Statement(s):

OUs 1, 2 and 5 are complete and protective of human health and the environment. OUs 3/6 and 4 are expected to be protective of human health and the environment, and immediate threats have been addressed. The landfill cover and landfill gas extraction systems are operating and functioning as designed. Groundwater monitoring data suggests that the contaminated groundwater underlying the Site has remained within site boundaries.

Sand Creek Industrial Superfund Site
Second Five-Year Review Report

I. Introduction

EPA Region 8 has conducted a second five-year review of the remedial actions implemented at the Sand Creek Industrial Superfund Site located in Denver and Adams Counties, Colorado. This review was conducted from July through mid-September 2000. This report documents the results of the review. The purpose of five-year reviews is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports. In addition, five-year review reports identify deficiencies found during the review, if any, and identify recommendations to address them.

This review is required by statute. EPA must implement five-year reviews consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA §121(c), as amended, states:

> If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented.

The NCP part 300.430(f)(4)(ii) of the Code of Federal Regulations (CFR) states:

> If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

This is the second five-year review for the Sand Creek Industrial Superfund Site. The triggering action for this review is the completion of the first five-year review on September 20, 1995. Due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unrestricted use and unlimited exposure, another five-year review is required.

II. Site Chronology

1940s - Well located on nearby property found to contain gasoline.

1961 - C.H. conducts earliest documented investigation of contaminated groundwater.

November 8, 1976 - C.H. memo associates Shell Chemical to acids in ponds at Site.

1977 - Two explosions that kill two men and injure five others, are traced to landfill.

1982 - Groundwater samples, near the refinery property, contains VOCs..

December 30, 1982 - Site proposed for listing on the National Priorities List (NPL).

September 8, 1983 - Final Listing on NPL.

November 13, 1987 - Baseline Risk Assessment.

March 4, 1988 - Site-wide Remedial Investigation/ Endangerment Assessment.

September 29, 1989 - Record of Decision (ROD) OUl.

September 28, 1990 - ROD OU5.

June 30, 1993 - ROD OU2, “no further action” alternative.

June 30, 1993 - ROD OU3/6.

September 8, 1993 - Explanation of Significant Differences OU1.

September 8, 1993 - ROD Amendment OU5.

April 7, 1994 - ROD OU4.

September 29, 1994 - Preliminary Site Close-out Report.

September 20, 1995 - First Five-Year Review Completed.

January 11, 1996 - Final Close-out Report.

December 20, 1996 - Deletion from NPL.

III. Background

Location. The Sand Creek Site is located approximately 5 miles northeast of downtown Denver, Colorado in a heavy industry area. It resides partly within the City of Denver in Denver County, and partly within Commerce City in Adams County. The Site occupies about 550 acres, of which approximately 300 acres comprises the area affected by remediation efforts. The study area is bounded on the north by Sand Creek, on the south by 48th Avenue, and on the east by Ivy Street and the eastern extent of the 48th and Holly Landfill. The western boundary is approximated by Dahlia Street, Colorado Boulevard and Vasquez Boulevard. See Figure 1.

Land Use. Land use near the Site is primarily industrial and includes trucking firms, petroleum refining operations, chemical production and supply companies, warehouses, and small businesses. The Site and properties adjacent to the Site are zoned for light and heavy industrial uses. Fifteen residences, approximately 25 people, are located within a one-mile radius of the Site. The daytime population reaches several hundred because of the local businesses and industrial nature of the area.

The United States owns or controls property in the vicinity of North Dahlia Street. It owns a portion of a warehouse known as the Matteson warehouse and has the ability to control the sales of two parcels of property adjacent to the Matteson warehouse. The two parcels total 11.5 acres. The United States also owns a 56 acre parcel of land known as the Colorado Paint property. The parcel is part of the 48th and Holly Landfill. These properties are zoned for industrial use.

Site History. Four sources of contamination (all currently inactive) are known at the Site: the **Colorado Organic Chemical Company (COC)** property, the **L-C Corporation (LCC)** property, the **Oriental Refinery** property, and the **48th and Holly Landfill (Landfill).** COC manufactured pesticides beginning in the 1960s and intermittently through 1984. There was a serious fire at the COC property in 1968. In 1974 the Tri-County District Health Department cited COC for unsatisfactory waste practices and unsatisfactory worker safety conditions.

The LCC property has been used for industrial purposes since 1948. In 1968 LCC contracted with Shell Chemical Company to use the property for storage and neutralization of spent acidic wastes from Shell's herbicide chemical plant at the Rocky Mountain Arsenal. In 1974, livestock that strayed onto the property contracted severe chemical burns from contact with the acid pits.

The Oriental Refinery property was the site of a fire in 1955 which resulted in the release of approximately 48,000 gallons of refined petroleum products.

At the Landfill, waste disposal operations were conducted between 1968 and 1975, during which time, demolition and domestic refuse were accepted. In 1977, two explosions, that killed two men and injured five others, were traced to the migration of methane gas from the Landfill.

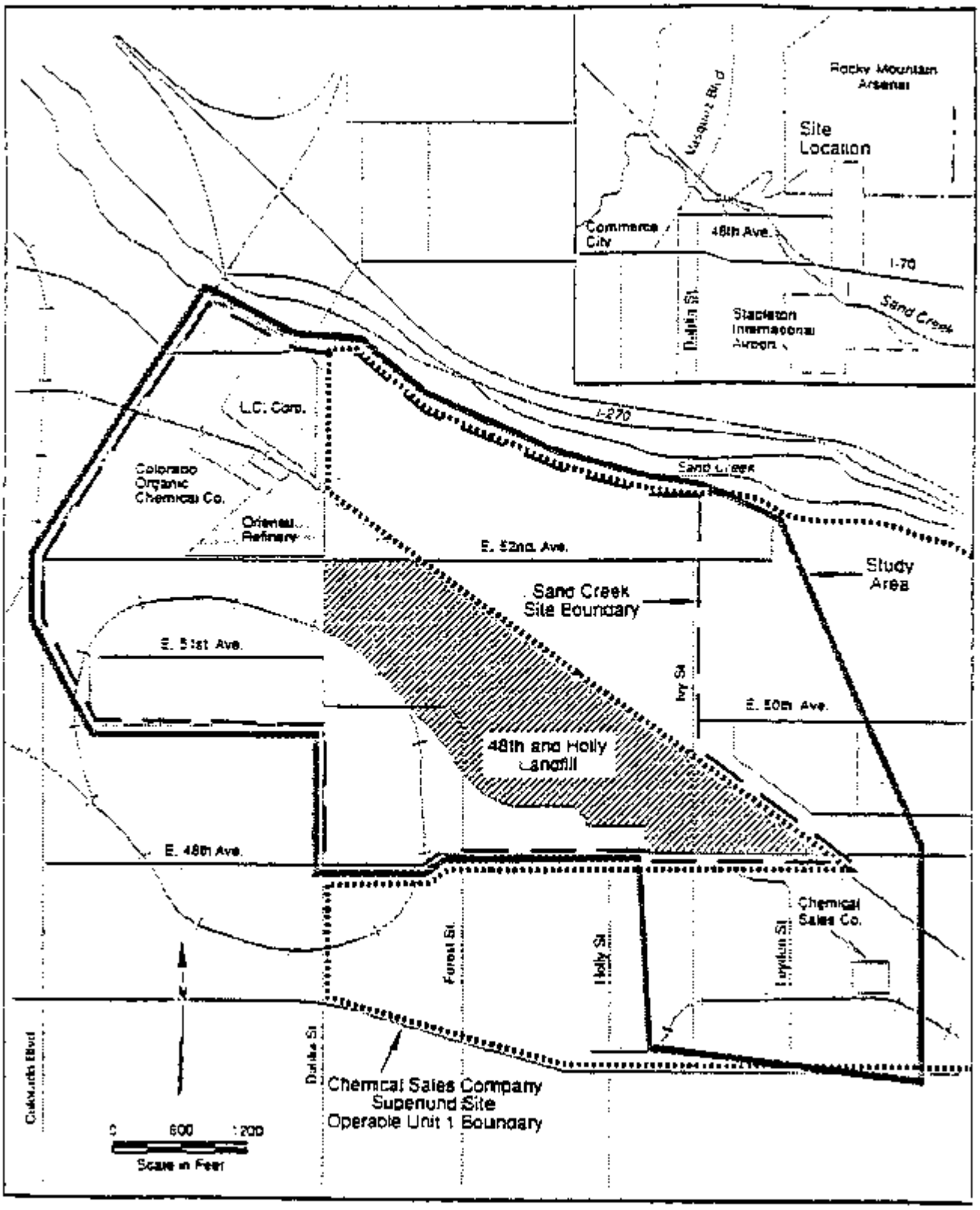


Figure 1: Vicinity Map - - Sand Creek Industrial Superfund Site

The Colorado Department of Public Health and the Environment (CDPHE), formerly known as the Colorado Department of Health (C.H.), and a variety of local agencies began intensive studies of the Site contamination about the mid-1970s. EPA involvement began around 1980. Because of the serious environmental hazards at the Site (landfill gas, pesticides, refinery wastes, etc.), it was designated as a Superfund site and proposed for inclusion on the National Priorities List (NPL) on December 30, 1982. The final date for NPL listing was September 8, 1983.

A Site-Wide *Remedial Investigation (RI)/Site Characterization Report* for the Sand Creek Industrial Superfund Site was completed on March 4, 1988. Sampling and analyses in 1987 detected more than 75 compounds in the Site's soil, groundwater, and surface water. Of the 75 compounds initially detected, 20 were designated as contaminants of concern, including volatile organic compounds (VOCs), pesticides, and heavy metals.

Eventually, because of the complex nature of the Site, it was divided into six study regions known as operable units (OUs). The OUs are described in Table 1. Also see Figure 1.

Operable Units 1, 2, 4, and 5 are Fund lead, meaning that the cost of cleanup is being paid by the Federal Trust Fund ("Superfund"). Operable units 3 and 6 are Potentially Responsible Party (PRP) lead, meaning that the cleanup is being funded by private sources. OUs 3 and 6 also address the same geographical area (i.e. the landfill) and were addressed in one ROD.

Table 1: Location and Description of Sand Creek Operable Units

OU	Location	Description
#1	COC Property	Contaminated Buildings and Deep Soils
#2	LCC Property	Acid Pits
#3	Landfill	Soils, Groundwater, Surface Water
#4	Groundwater	Site-Wide
#5	COC Property	Surface and Shallow Soils
#6	Landfill	Methane Gas

Subsequent to the Site-Wide RI, some additional investigation and characterization was necessary, resulting in several RIs and Feasibility Studies (FSs) for individual OUs (Table 2).

Table 2: Sand Creek RI/FS Documents subsequent to the Site-Wide RI.

OU	Document	Date
#1	*Final Draft Feasibility Study*	January 13, 1989
#1	*Feasibility Study Addendum*	July 20, 1989
#2	*Final Remedial Investigation Report*	December 8, 1992
#3/#6	*Revised Final Remedial Investigation Summary Report*	June 3, 1992
#3/#6	*Final Focused Feasibility Study Report*	March 19, 1993
#4	*Remedial Investigation Report*	September 1993
#4	*Final Feasibility Study*	February 7, 1994
#5	*Feasibility Study*	August 8, 1990

Site Hydrogeology. In general the groundwater beneath the Site flows north towards Sand Creek. The OU 4 Remedial Investigation utilized a multi-aquifer concept as the basis for the groundwater flow model. The model defines three hydrostratigraphic units in hydraulic communication with one another, designated as Aquifer 0, Aquifer 1, and Aquifer 2 (See Figures 2 and 3).

Aquifer 0 underlies the eastern portion of the study area, and consists primarily of sand with interbedded, discontinuous layers of silt, clay and gravel. Aquifer 0 is separated from the other two aquifers by a discontinuous clayey strata designated Clay Layer 0. Aquifer 1 underlies the northwest portion of the Site beneath the Oriental Refinery property and portions of the COC and L.C. Corporation properties. It is composed of stratified sand and gravel. It is separated from Aquifer 2 by discontinuous Clay Layer 1. Aquifer 2 underlies most of the Site, consisting of a thick layer of sand and gravelly sand with interstitial clay and clay lenses. Depth to water in Aquifer 2 ranges from 4 to 68 feet below ground surface, increasing in depth from north to south across the Site.

IV. Remedial Actions

Remedy Selection

The primary objectives of the response actions at the Sand Creek Site were to protect human health and the environment and to return the site to industrial land use. These objectives consisted of the following four primary goals:

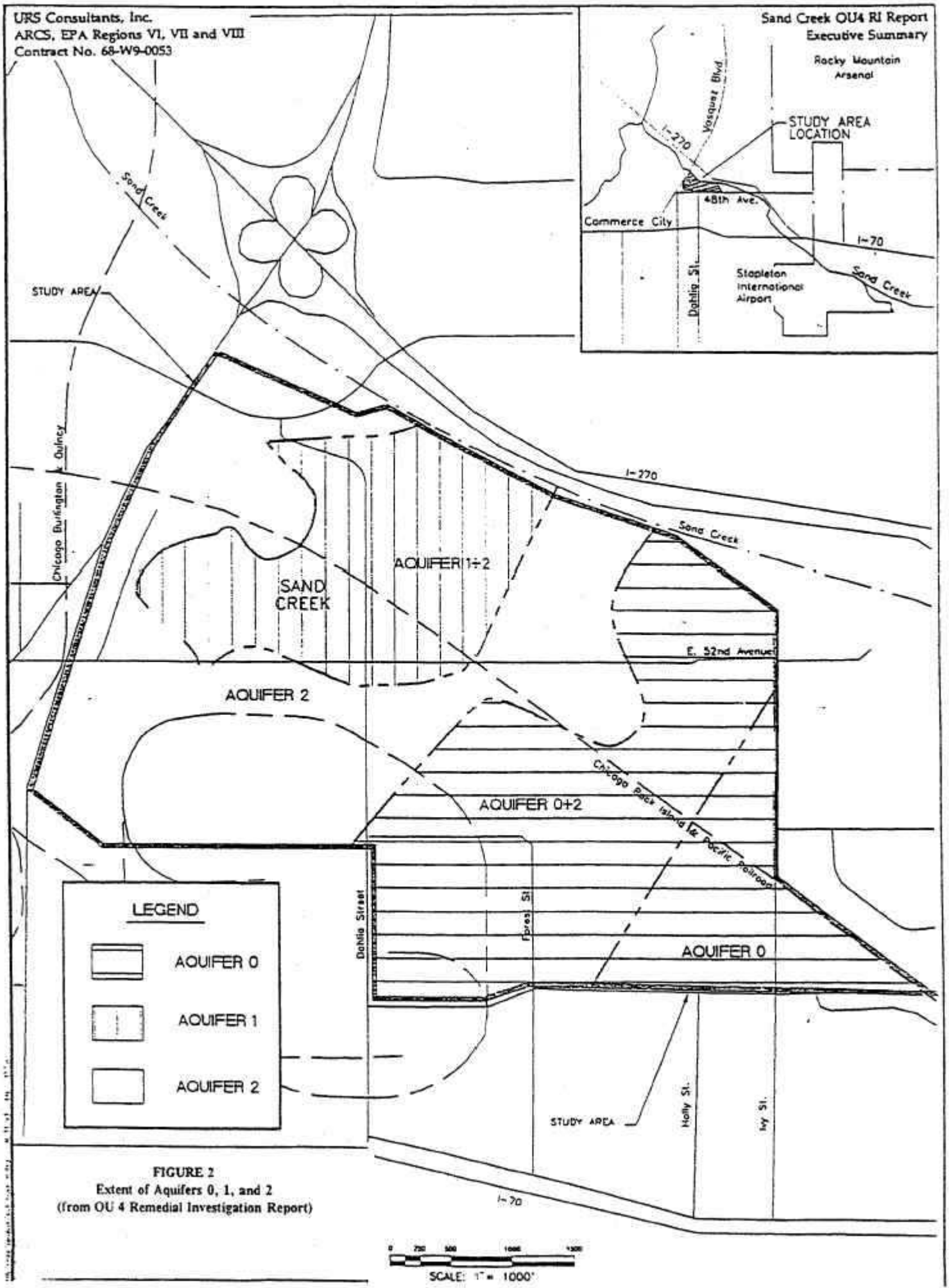


FIGURE 2
Extent of Aquifers 0, 1, and 2
(from OU 4 Remedial Investigation Report)

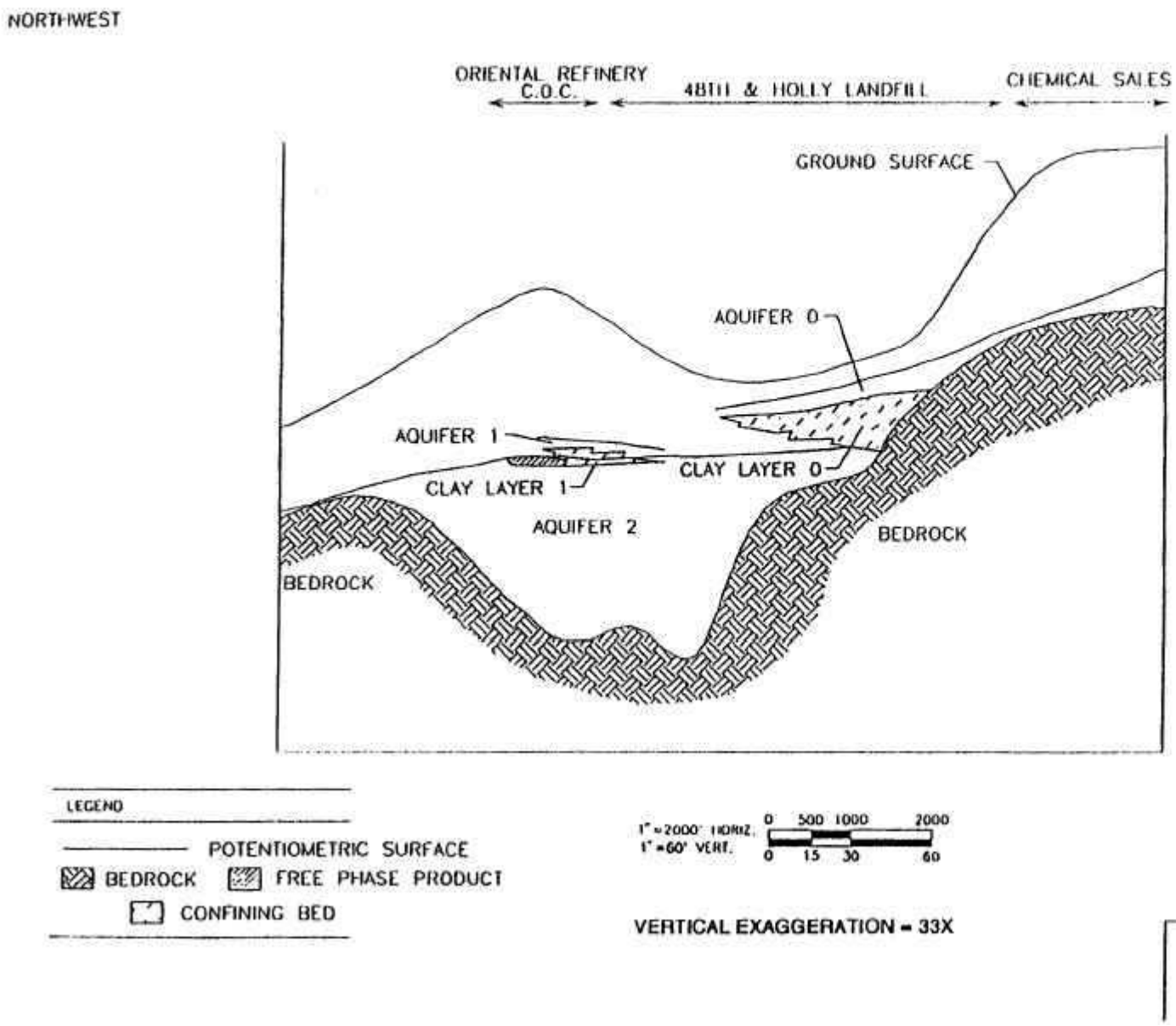


FIGURE 3
Conceptual Cross-Section
(from OU 4 Remedial Investigation Report)

- to reduce the risk to industrial workers exposed to soil through ingestion or inhalation so that they would not suffer health problems;
- to ensure that a child walking or playing while trespassing onto the Site would not have health problems resulting from area soils;
- to ensure that gases generated from the Landfill would not migrate off-site and cause explosions or otherwise endanger health; and,
- to reduce the contamination source area for groundwater absorption so that "potential groundwater use" would be possible.

Operable Unit 1 (OU 1). The selected remedy for OU 1 contained the following four components:

- demolition and disposal of contaminated buildings and tanks;
- excavation, incineration, and disposal of soils with Halogenated Organic Compound (HOC) contamination levels greater than 1000 ppm;
- backfilling of excavated areas with clean soil; and
- Soil Vapor Extraction (SVE) treatment of subsurface soils contaminated with Volatile Organic Compounds (VOCs).

(The subsurface soils are located at depths from five feet to the level at which groundwater is encountered, generally 12 to 20 feet.)

A ROD for OU 1 was signed on September 29, 1989. Subsequently, an Explanation of Significant Differences (ESD) for OU 1 was signed on September 8, 1993. Other than an estimated 1,000 cubic yards (cy) of surface soils highly contaminated with HOCs, OU 1 remediation focused on treatment of subsurface soils. The OU 1 ROD specified that remediation of the surface and shallow soils contaminated with less than 1,000 ppm HOCs (estimated at the time of the signing of the OU 1 ROD to be 38,000 cubic yards) would be addressed by the creation of an additional operable unit, OU 5.

The remedial action objectives identified in both the September 1989 ROD and September 1993 ESD consisted primarily of treatment of HOC-contaminated surface soils through excavation and incineration, and treatment of VOC-contaminated subsurface soils through SVE. Treatment of soils was undertaken to reduce the health risk to industrial workers and children exposed to soil through ingestion or inhalation and to reduce the contamination source area for groundwater absorption.

Operable Unit 2 (OU 2). The acid pits on the LCC property were neutralized on three occasions in the late 1970s and early 1980s. Because of these cleanup activities, and low levels of contaminants of concern at OU 2, no significant risk to human health or the environment existed in this area of the Site. Therefore, a "no further action" alternative was adopted as described in the June 30, 1993 ROD for OU 2.

Operable Units 3/6 (OUs 3/6). The ROD for OUs 3 and 6 was described in a single document (June 30, 1993) since OUs 3 and 6 are both associated with the 48th and Holly Landfill. The selected remedy for OUs 3/6 contained five primary components:

- extraction and treatment of the Landfill's methane gas using the Landfill Gas-Extraction System (LFGES);
- maintenance of the Landfill's soil cover system and LFGES with improvements as required;
- maintenance of the area's perimeter fence and warning signs;
- implementation of additional institutional controls as necessary; and
- implementation of periodic site reviews and monitoring program for groundwater and methane gas.

Prior to the writing of the ROD, some cleanup activities had been completed at the Site. In 1991, the Landfill was fenced with the installation of the LFGES; in 1992, the Landfill was improved and depressed areas filled and graded. The remedial action objectives identified in the June 1993 ROD consisted primarily of methane gas removal, institutional controls, and monitoring. These actions were undertaken to reduce the health risk to industrial workers and children exposed to soil through ingestion or dermal contact, to reduce the contamination source area for groundwater absorption, and to ensure that gases from the Landfill would not migrate off-site and cause explosions or otherwise endanger health.

Operable Unit 4 (OU 4). The selected remedy for OU 4 contained three primary components:

- quarterly groundwater and semi-annual surface water monitoring to ensure that OU 4 contamination does not impact Sand Creek or downgradient aquifers at some future date;
- removal of the recoverable portion of the Light Non-aqueous Phase Liquid (LNAPL) plume by Dual Vapor Extraction (DVE) and transport of the recovered LNAPL to an off-site recycling facility; and,
- institutional controls to minimize exposure to contaminated groundwater by limiting groundwater usage to non-domestic purposes and preventing any usage of highly contaminated groundwater.

The remedial action objectives identified in the April 7, 1994 ROD consisted primarily of institutional controls and monitoring. These action were undertaken to prevent ingestion of potentially contaminated groundwater, to ensure contamination does not impact Sand Creek, and to monitor groundwater quality so that future groundwater use would be possible. Groundwater contamination was addressed through remediation of the contamination source areas, namely the soils in OUs 1, 3, and 5.

Operable Unit 5 (OU 5). The selected remedy for OU 5 contained four primary components:

- excavation and on-site treatment of contaminated surface and shallow soils (those soils located from the surface to a depth of 5 feet) using Low Temperature Thermal Treatment

(LTTT) with collection of contaminants on activated carbon;
- off-site regeneration of spent activated carbon;
- backfilling of excavated areas with treated soils; and
- revegetation of the area to minimize erosion and dispersion of soil.

A ROD for OU 5 was signed on September 28, 1990. An amendment to the ROD was signed on September 8, 1993. The target cleanup goals identified in the ROD Amendment were determined based on sampling efforts performed during November, 1992 (Phase 3 sampling) and described in a 3 volume *Sampling and Analysis Report*, March 31, 1993. A *Risk Analysis* (May 11, 1993) was prepared which calculated risk based on the 1988 *Risk Assessment* exposure scenarios and the new sampling data. The target levels defined in this *Risk Analysis* were modified after EPA and C.H. (now CDPHE) decided to add an inhalation exposure pathway to the risk analysis calculations.

The initial estimate from the Site-Wide RI was that 38,000 cubic yards (cy) of surface and shallow soils would need remediation. Based on additional detailed and comprehensive sampling efforts (primarily, the Phase 3 sampling), areas initially thought to be contaminated were found not to have contamination that presented any health risk. Therefore, the estimate of soil volume which would require treatment was reduced since these areas did not need remediation. This subsequent sampling reduced the estimate from 38,000 cy to 14,000 cy, and then from 14,000 cy to 8,000 cy as stated in the OU 5 ROD and ROD Amendment.

The September 1990 ROD and December 1993 ROD Amendment focused on the treatment of surface and shallow soils contaminated with pesticides, metals and VOCs. The remedial action objectives were to reduce the health risk to industrial workers and children exposed to soil through ingestion or inhalation and to reduce the contamination source area for groundwater absorption.

A summary of the contaminants of concern and the remedies selected for the individual OUs at the site is shown in Table 3.

Table 3: Contaminants of Concern and Selected Remedies for Sand Creek OUs

OU	Contaminant(s) of Concern	Selected Remedy
#1	Pesticides above 1,000 ppm	Excavation/Incineration
	Volatile Organic Compounds	Excavation and Soil Vapor Extraction
#2	None	No Further Action
#3/6	Volatile Organic Compounds	Capping, Institutional Controls, and Monitoring
	Metals	Capping, Institutional Controls, and Monitoring

	Methane Gas	Landfill Gas Extraction System
#4	Volatile Organic Compounds	Institutional Controls and Monitoring
	Pesticides/Herbicides	Institutional Controls and Monitoring
	Metals	Institutional Controls and Monitoring
	CMPSO[a]	Institutional Controls and Monitoring
#5	Pesticides/Herbicides	Excavation and Low Temperature Thermal Treatment
	Metals	Excavation and Low Temperature Thermal Treatment

a. CPMSO = para-chlorophenylmethylsulfone

Remedy Implementation

Operable Unit 1 (OU 1). An EPA approved Final *Remedial Action Completion Report* (RACR), dated September 20, 1995 documents that the remedial action for OU 1 was completed in accordance with the requirements of the September 29, 1989 ROD and September 8, 1993 ESD.

The remedial actions at OU 1 consisted of three primary tasks: demolition and disposal of contaminated buildings and debris, excavation and incineration of highly contaminated soils, and soil vapor extraction (SVE) treatment of subsurface soils.

Between August 1991 and April 1992, EPA removed approximately 2,500 tons of material including three buildings, four rail cars, twelve storage tanks, and other debris. Prior to disposal, waste was characterized and then disposed in appropriate permitted landfills.

The ROD and ESD both estimated that approximately 1,000 cubic yards of highly contaminated soil would need to be excavated and incinerated. Field sampling and analysis performed during the remedial design phase for OU 1 determined that only about 7 cubic yards of material were contaminated above the ROD/ESD action levels. A total of 18,397 pounds of soil was excavated and sent off-site for incineration.

Between September 1993 and April 1994, EPA utilized SVE to remove over 176,000 pounds of volatile organic compound (VOC) contamination from the OU 1 soils, of which approximately 3,250 pounds were targeted contaminants of concern for OU 1. Catalytic oxidation (which destroyed the VOCs with 98.8% efficiency) was used as the pollution control equipment for the VOCs. The spent catalyst (2,400 pounds) from the catalytic oxidizer was disposed offsite in a permitted facility.

Operable Unit 2 (OU 2). No further action was necessary for OU 2 (See previous section).

Operable Units 3/6 (OUs 3/6). On August 15, 1990, PA signed an *Unilateral Administrative Order (UAO)* for a removal action for OU 6 which became effective August 25, 1990 (Docket No. CERCLA-VIII-90-20). The UAO addressed risks associated with gaseous emissions from the Landfill. On December 24, 1990, EPA issued an *Action Memorandum* for an Enforcement-Lead Removal Action. The Action Memorandum required the installation and operation of a gas-collection system, and installation and maintenance of a security fence and a vegetative cover for the Landfill.

The *Final Design Submittal* for a Landfill Gas-extraction System (LFGES) for OU 6 was approved by EPA on January 28, 1991. The LFGES system involves collection of gaseous emissions (primarily methane) through underground piping, combustion of the gases in an enclosed flare system, and collection and disposal to a Publically Owned Treatment Works (POTW) of the condensate produced in the process.

An EPA approved *Final Removal Action Report* for OU 6 (October 31, 1991) documents that the removal action was completed in accordance with the requirements of the Action Memorandum. In addition, any modifications to the constructed LFGES from the *Final Design Submittal* are described in the *Final Removal Action Report*. The LFGES system began operating on May 31, 1991.

An EPA approved *Final Removal Action Completion Report (RACR)*, dated November 22, 1994 documents that the remedial action for OUs 3/6 was completed in accordance with the requirements of the June 30, 1993 ROD. The RACR and all remedial actions were completed by Potentially Responsible Parties (PRPs).

The first requirement of the ROD was to continue operation and maintenance of the Landfill Gas Extraction System (LFGES) installed by the PRPs in 1991 under an August, *1990 Unilateral Administrative Order (UAO)* for a removal action for OU 6. Since the LFGES began operation, condensate is discharged in batches after analysis is performed in accordance with waste water discharge permit #S0330-1 and EPA. Operation of the LFGES may be modified or terminated only with the approval of EPA, provided gas monitoring indicates that methane concentrations are below levels of regulatory concern.

In addition to methane gas removal, the ROD requires institutional controls. In 1991, the PRPs installed a three-strand, smooth-wire fence around the perimeter of the Landfill. To deter access to the Landfill, the fence holds warning signs identifying hazardous conditions. In 1992, the PRPs implemented a soil cover improvement program for the Landfill. The program addressed erosion, poor drainage, and lack of vegetative cover via fill placement, erosion control, and reclamation. Approximately 62,000 cubic yards of fill were placed, graded, and compacted for Landfill cap maintenance. Gullies, trenches, and depressions were corrected. Revegetation and reclamation activities were performed over approximately 30 acres of the Landfill.

Continued monitoring of Landfill gas and groundwater was required by a *Unilateral Administrative Order (UAO)* for Remedial Design/Remedial Action, effective January 31, 1994. Landfill gas monitoring (for methane) began in 1991 with the startup of the LFGES. As the Landfill is still generating explosive concentrations of methane, the LFGES is needed to mitigate the potential accumulation of methane in buildings, trenches, utilities, and other structures which create explosive conditions that threaten public safety. Groundwater monitoring began in September, 1994.

Operable Unit 4 (OU 4). An EPA approved *Remedial Action Completion Report (RACR)*, dated September 20, 1995, documents that the remedial action for OU 4 was completed in accordance with the primary objectives specified in the April, 1994 ROD.

EPA conducted quarterly groundwater and semi-annual surface water monitoring during the period of September 1994 to September 1995 for OU4. Because the source areas for groundwater contamination were remediated under OUs 1, 3, and 5, monitoring was specified as a primary objective for OU 4 in the April 1994 ROD.

Another goal identified in the April 1994 ROD was to a recover, to the extent possible, a portion of a light non-aqueous phase liquid (LNAPL) plume located in the northwest portion of the Site. The removal was to be accomplished by utilizing Dual Vapor Extraction (DVE). The equipment used for DVE was fundamentally the same as that used for the SVE treatment of OU 1 soils. EPA operated the DVE system from October 1994 to April 1995. During this time, only 1,820 gallons of LNAPL were recovered, far below the estimated total volume of the LNAPL. (The total liquid and vapor LNAPL recovered was 23,110 pounds.) The data showed that, even with an active "pump and treat" system, the LNAPL contamination is fairly immobile. The design and results of this system can be utilized by EPA in the future if it is determined that the plume is migrating off-site and containment measures are necessary.

A second LNAPL plume, comprised of petroleum product, was found in the southwestern part of the Site in 1991. Because it is petroleum based, the plume is not subject to remedial actions under CERCLA.

Operable Unit 5 (OU 5). An EPA approved *Remediation Action Completion Report (RACR)*, dated October 28, 1994 documents that the remedial action for OU 5 was completed in accordance with the requirements of the September 8, 1993 ROD amendment.

In August and September of 1993, approximately 3,300 cubic yards of soil were excavated during the OU 1 RA. This was done to ensure that all soil contaminated with pesticides and arsenic above the Site's action levels had been removed from a portion of OU 1 prior to implementation of Soil Vapor Extraction (SVE). An additional 4,954 cubic yards of soil was excavated during June and July 1994, for a total excavated volume of 8,254 cubic yards.

Between June 28 and July 29, 1994, the excavated soil was remediated using Low Temperature

Thermal Treatment (LTTT). After backfilling with the treated soil, a cover crop was planted to restore the Site and to help prevent erosion.

During remedial activities at the Sand Creek Industrial Superfund Site, additional wastes consisting of buried drums and debris were discovered in the area of OU 5. As these wastes posed a high risk, EPA initiated a time-critical removal action to respond to the situation. During the removal action, additional wastes were encountered and disposed.

The removal response activity was carried out from October, 1994 to July, 1995. This activity consisted of the removal and off-site disposal of: 40 cubic yards (cy) of crushed drums, approximately 2000 cubic yards of oil contaminated soils, approximately 200 cy of building and general debris, approximately 230 cubic yards of asbestos and oil contaminated soils, and 40 cy of RCRA listed waste. Seven compressed gas cylinders were found on-site, of which six were vented on-site after appropriate treatment and one was shipped off-site for disposal. An additional 600 gallons of Number 6 waste fuel oil was also removed and sent offsite to a recycling facility. This area of the site was regraded and reseeded following the completion of all removal and disposal activities. A *Pollution Report* dated September 30, 1995 documents all removal activities performed and disposition of the wastes sent off-site.

System Operations

The review of system operations includes OUs 3/6 and OU 4, the only OUs requiring O&M. OUs 1, 2 and 5 are complete and protective of human health and the environment.

Operable Units 3 and 6 - Landfill. O&M tasks related to the landfill consist of:

- O&M of the LFGES
- Maintenance of the soil cover system
- Maintenance of the perimeter fence and signs
- Implementation of an environmental monitoring program (landfill gas and groundwater)
- Maintenance of institutional controls
- Conducting periodic site reviews

O&M of the various components of the LFGES is conducted in accordance with the site operation and maintenance manual and appropriate manufacturer's operations and maintenance manuals. The LFGES is operated on a relatively constant basis, except for periodic shutdowns to facilitate routine maintenance activities.

The soil cover system, perimeter fence, and signs are inspected during each extraction well monitoring event for the purpose of evaluating the general integrity and condition. The inspection includes, but is not limited to, an evaluation of the condition of the vegetative cover, effects of erosion and burrowing animals, and subsidence. Reseeding, weed-cutting, fence repair

and sign repair are conducted, as needed.

Landfill gas monitoring is conducted at least monthly at 28 gas monitoring probes, 75 extraction wells, and blower building inlet and outlet ports. Groundwater monitoring in the immediate area of the landfill is conducted semi-annually to assess, on a continuing basis, the potential impact of the landfill on the quality of groundwater downgradient of the landfill. Activities include collecting water-level measurements, groundwater sampling and well inspection. See Figures 4 and 5.

OU 4 - Site-wide Groundwater Monitoring. In cooperation with EPA, the Colorado Department of Public Health and Environment (CDPHE) conducts ground and surface water monitoring at the Site on a semi-annual basis. The scope of work and data collection are outlined in the Sampling and Analysis Plan for Operation and Maintenance, CDPHE November 1996. The overall objectives of the site-wide sampling are to ensure contaminants are not migrating offsite or contaminating surface water at concentration levels above remediation goals and to monitor contaminated wells for expected decreases due to natural attenuation. See Figure 5.

Progress Since the Last Five-Year Review

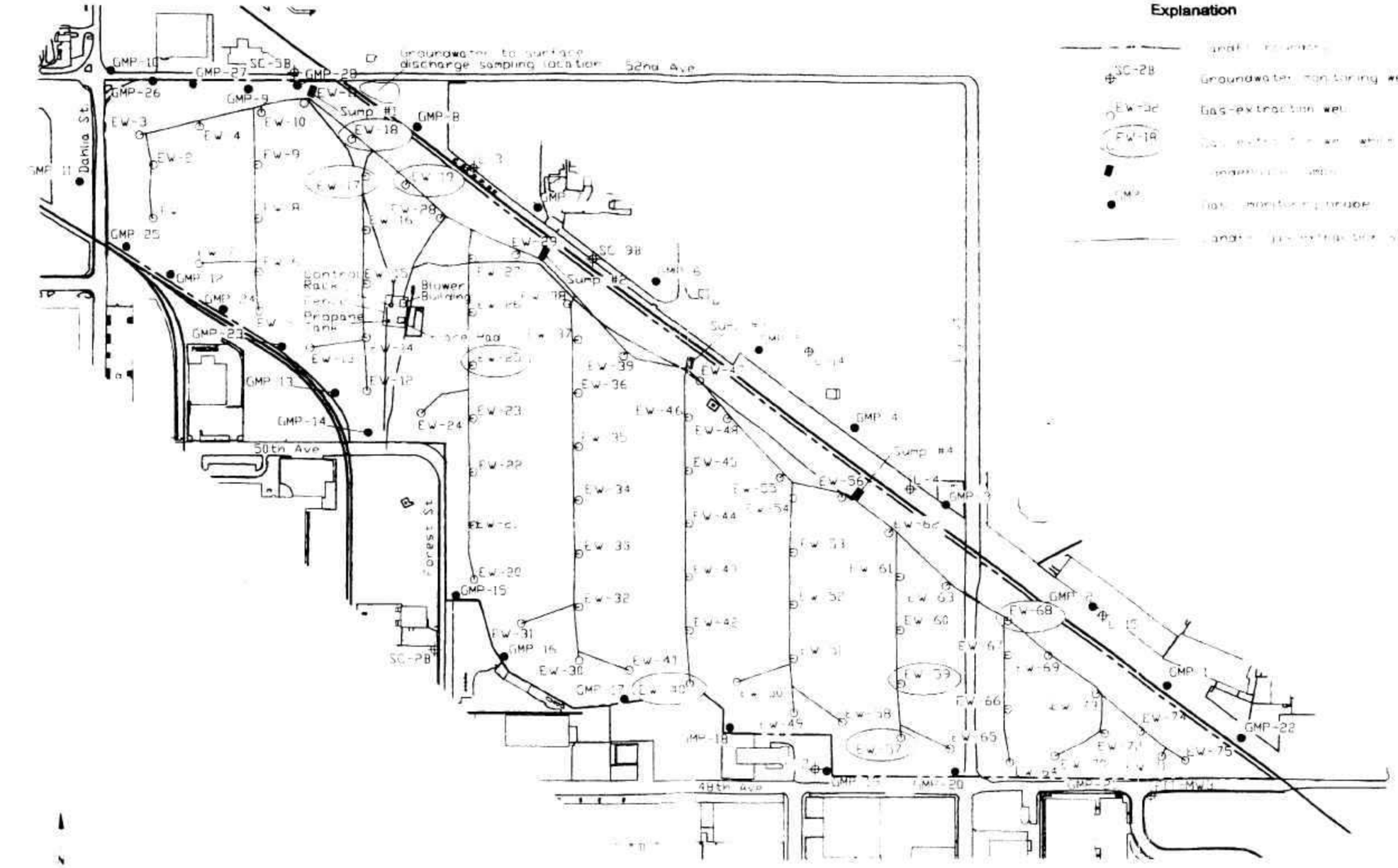
During the first five-year review, the remedy was found to be protective of human health and the environment and no deficiencies were noted. Since the last five-year review, the Site has been deleted from the NPL (December 1996).

V. Five-Year Review Process

The Sand Creek Industrial Superfund Site five-year review was led by Armando Saenz, Remedial Project Manager for the Sand Creek Industrial Superfund Site. The following team members assisted in the review:

- Armando Saenz, EPA Remedial Project Manager
- Norval Schoenhals, EPA Superfund Program Assistant
- Ted Fellman, EPA Community Involvement Coordinator
- Charles Kienast, EPA Community Involvement Assistant
- Richard Sisk, EPA Attorney

The five-year review consisted of the following activities: a review of relevant documents; interviews with representatives of the LFGES operational contractor and CDPHE; review of ARARS and O&M data; and, site inspections. A notice that the five-year review was in progress



Explanation

- Groundwater monitoring well
- Gas-extraction well
- Gas-extraction trench
- Gas monitoring probe

Scale in feet

Harding Lawson Associates
Engineering and

Landfill Gas-extraction System and Monitoring Well Network
48th and Holly Landfill

APPROVED
JKW

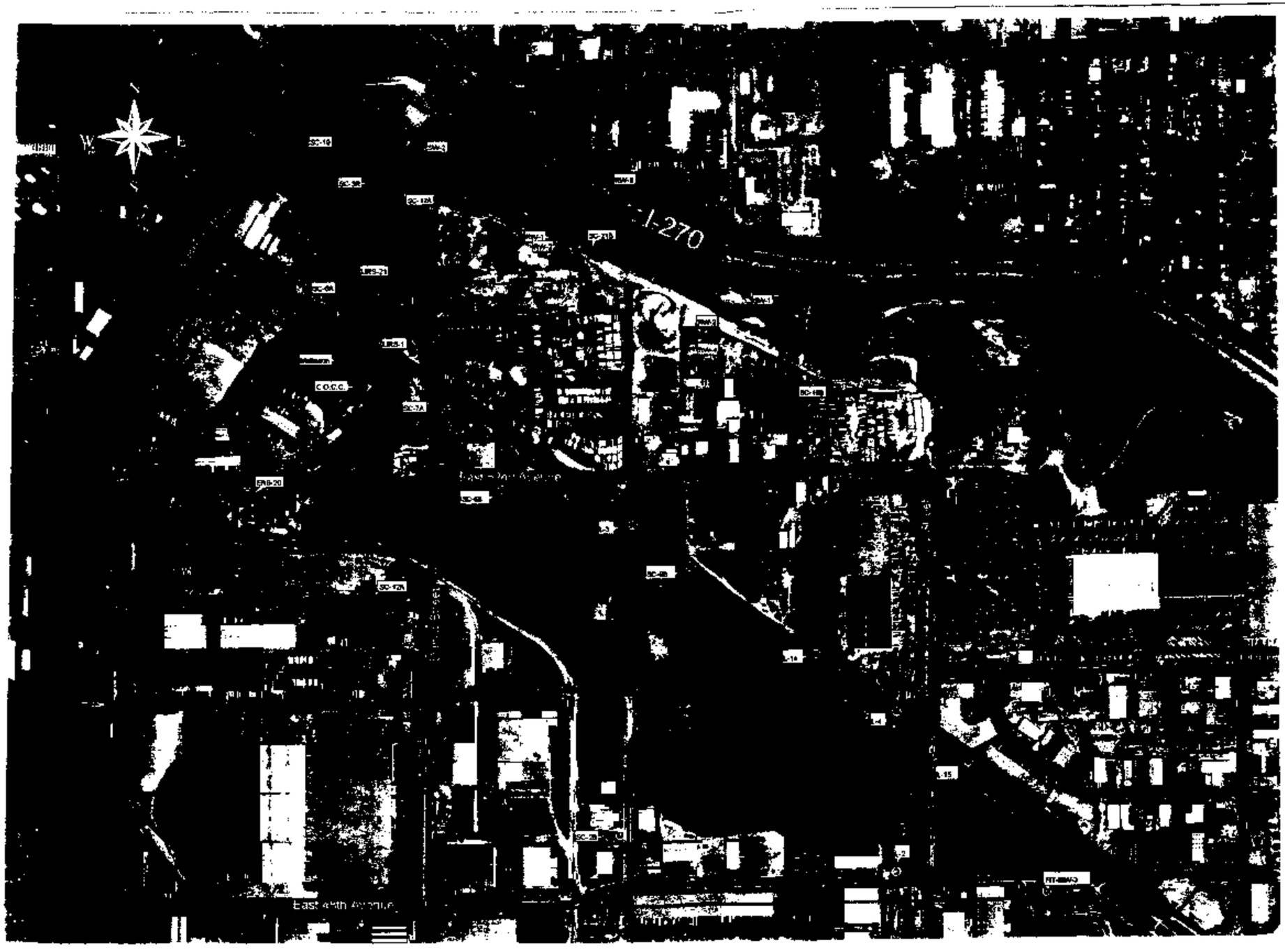


FIGURE 5
Location of Sand Creek Industrial Site

☆ **OU4 Monitoring Well**

✳ **OU4 Surface Water**

OU3&6 Monitoring Well

Colorado Department of Public Health and Environment

Hazardous Materials and Waste Management Division

was placed in the local and regional newspapers. The notice of completion of the five-year report will be placed in the local and regional newspapers.

VI. Five Year Review Findings

Interviews

The following individuals were contacted in person or by telephone by Armando Saenz as part of the five-year review:

- Bill Brown, Environmental Specialist, KRW Consulting, Inc. (Interviewed 9/11/00)
- Mary Scott, Project Manager, CDPHE (Interviewed 9/12/00)

Bill Brown. Mr. Brown stated that he is not aware of any mayor issues related to the landfill gas extraction system, soil cover system and wire fence surrounding the Site. The most pressing problems relate to differential landfill settlement and security.

Low points in sub-header lines caused by differential landfill settlement are restricting drainage from the sub-headers to the condensate sumps, thereby creating intermittent gas flow blockage in the system (not significant enough to cause automatic shutdown). Adjustments have been made, but he stated that the problem will be further addressed by the end of this year.

The security chain and lock on the gate located at the 50th and Forest entrance were cut on three different occasions. On two occasions the unknown party replaced the Site's lock with their own. He stated that KRW removed the illegal locks and replaced them with a Site lock after each incident. The chain was replaced with one of higher strength. He also stated that the Commerce City Police Department was notified.

Mary Scott. Ms. Scott stated that she believed that Site O&M, particularly the site-wide monitoring program (OU 4), was progressing as planned and that there were no major issues at this time.

Site Inspection

The Site was inspected on February 16, 2000 and September 11, 2000. During the site inspections, remedial systems were inspected. The inspection evaluated the landfill soil cover, the landfill gas collection system and site fencing.

The landfill cover was found to be in good condition. No significant effects of burrowing animals and erosion were observed. The soil cover was thorough and abundant. Small depressions near wells were noted in the northwestern part of the landfill. Weeds found along Ivy in February were not found in September.

The landfill gas collection system appeared to be operating and functioning properly. No sign of damage was noted for the monitoring probes, extraction wells and building area. No sign of damage was also noted for the groundwater monitoring wells.

The perimeter fence was cut in a couple of places near the corner of 50th and Forest Street.

Risk Information Review

ARARs identified in the Site's OU-specific decision documents were assessed in detail. The primary purpose of this review was to determine if any newly promulgated or modified requirements of federal and state environmental laws have significantly changed the protectiveness of the remedies implemented at the Site. The ARARs reviewed were those included in the last five-year review and documented in detail in a September 1995 report entitled *Applicable or Relevant and Appropriate Requirements Analysis for the Sand Creek Superfund Site*.

Overall, EPA found no newly promulgated or modified ARARs that would significantly change the protectiveness of the remedies implemented at the Site. EPA and CDPHE will continue to monitor this Site and any future changes or modifications in ARARs will be reported in the next five-year review.

Data Review

OUs 3 and 6 - Landfill. A review of records and monitoring reports through June 2000, indicates OUs 3/6 are being operated and maintained as required by the UAO, Final Workplan/Remedial Design Report and O&M Manuals.

The landfill gas extraction system is being operated on a relatively constant basis, except for periodic shutdowns to facilitate routine maintenance activities. Landfill gas monitoring is conducted at least monthly for 28 gas monitoring probes, 78 extraction wells and blower building inlet and outlet sample ports. Groundwater monitoring in the immediate area of the landfill is conducted semiannually for 9 groundwater monitoring wells surrounding the landfill. The following is an analysis of the most current data:

> **Landfill Gas Extraction System.** The remedial action objective for the LFGES is to achieve maximum methane concentrations below 5% by volume, the lower explosive limit of methane. The most current data (Appendix A) shows that methane concentrations were not detected in any of the gas monitoring probes surrounding the landfill, except GMP 16 where methane was detected in a very small volume, .1 % by volume in air, and only in one sampling. These results show that the LFGES is operating effectively and controlling off-site migration of methane. With the landfill still generating explosive concentrations of methane, the responsible parties will continue to operate the LFGES. Also see Figure 4.

Landfill Groundwater Monitoring. The objective of the groundwater monitoring program is to assess on a continuing basis the potential impact of the landfill on the quality of groundwater downgradient of the landfill. The groundwater underneath the Site generally moves north to Sand Creek. Analytical data collected during the last landfill groundwater sampling event were compared with historical data (Appendix B). For the nine wells sampled, current analytical results were compared with the historical data to assess whether a change in conditions (i.e. a significant increase or decrease in concentrations) has occurred at the wells. The analytical results for the last sampling event were compared to the historical maximum detected value for each well. Also see Figures 2 and 4. The evaluation indicates the following:

- At upgradient Wells FIT-MW 3 and L-2 in Aquifer 0 analyte concentrations were not detected or were less than the historical maximum. At upgradient Well SC-2B in Aquifer 2, the concentration for tetrachloroethene was reported at a concentration equal to the historical maximum. However, the historical maximum of PCE (5 ug/l) is quite low. Because this is such a small value, it is reasonable to assume that no significant change in concentration has occurred at this well (nor Wells FIT-MW 3 and L-2) that adversely affects groundwater quality.

- At downgradient Wells L-4, L-14 and L-15 in Aquifer 0, and SC-5B, SC-9B and L-3 in Aquifer 2, analyte concentrations were not detected or were equal to or less than the historical maximum. As a result, it is reasonable to assume that no significant change in conditions has occurred at these wells that adversely affects groundwater quality.

- At the groundwater discharge to surface location, analyte concentrations were not detected or were less than the historical maximum. As a result, it is reasonable to assume that no significant change in conditions has occurred at this location that adversely affects groundwater quality.

Because results of groundwater and surface water samples collected from Aquifer 0 and Aquifer 2 have not shown significant variability over time, it is reasonable to assume that no change in conditions has occurred in these areas that adversely affects groundwater quality in these areas.

OU 4 - Site-wide Groundwater Monitoring. A review of records and monitoring reports through August 2000, indicates OU 4 is being monitored as required by the Sampling and Analysis Plan of 1996 and its quality assurance standards.

CDPHE conducts groundwater and surface water monitoring at the Site on a sem-annual basis. The overall objectives of the site-wide sampling are to ensure contaminants are not migrating offsite or contaminating surface water at concentration levels above remediation goals and to

monitor contaminated wells for expected decreases due to natural attenuation. The following is an analysis of the most current data:

Groundwater samples were collected from fourteen groundwater monitoring wells and two surface water samples were collected from locations within the Site (Appendix C).

Well SC-12A is located in the southwest portion of the Site, upgradient from known sources of contamination (See Figure 5). This well was sampled to determine background levels of contaminants in the groundwater. Trichloroethene was measured at 2.2 *ug*/L, below the Remediation Goal (RG) of 5.0 *ug*/L.

Four wells located in the area subject to remedial actions under OU 1 and OU 5 were sampled: SC-6A, SC-7A, URS-1, and URS-21. As expected, these wells contained the most significant concentrations of contamination. Fuel related BTEX (benzene, toluene, ethylbenzene, xylene) compounds were detected, most likely originating from the release of refined petroleum products in the Oriental Refinery fire of 1965. Chlorinated organics were also measured in these wells, probably released during Colorado Organic Chemical pesticide production.

Four wells considered to be downgradient of the OU 1/5 source area are monitored to ensure contamination is not migrating off-site at levels above the RGs. These wells are SC-17A, SC-3R, RW-1 and RW-2. The lack of contamination in these wells indicates the groundwater contamination beneath the OU 1/5 area has not migrated to the north, the predominant direction of groundwater movement.

Four of the groundwater wells monitored, SC-16B, RW-3, RW-4 and SC-21B are located in the northeast portion of the Site and due to groundwater flow patterns should not be affected by the OU 1/5 source area. Well SC-16B contained concentrations of 1,1 dichloroethene, tetrachloroethene, and trichloroethene above RGs. The contamination in this well may originate from the contaminated plume from the adjacent Chemical Sales Company (CSC) Superfund Site, the landfill, or possibly another identified source. (Note: Construction of the Final Site Remedy for the CSC Site was recently completed. The remedy addresses contaminated soils and groundwater.)

One groundwater monitoring well, RW-5, is located north of the Site, across Sand Creek and Interstate 270. Concentrations of 1,1-dichloroethene, cis-1,2-dichloroethene, tetrachloroethene, and trichloroethene have gradually declined since the completion of remedial activities.

Sand Creek was sampled upstream and downstream of the segment expected to be impacted, if contamination from the Site was to migrate to the creek. Lack of contamination indicates the Site is not impacting the creek.

Sampling information suggests that groundwater contamination underlying the Site has remained within the OU 4 area. Sampled wells located near the northern perimeter of the Site and downgradient of the known sources of contamination, within the Site, contained either no contamination or levels of contamination well below the RGs. Surface sampling suggests Sand Creek has not been impacted by contaminants migrating from the Site. Sampling and trend analysis will continue in order to monitor the expected natural attenuation of existing contaminants.

VII. Assessment

The following conclusions support the determination that the remedy at the Sand Creek Industrial Superfund Site is expected to be protective of human health and the environment upon completion.

Question A: Is the remedy functioning as intended by the decision documents?

- ***HASP/Contingency Plan:*** Both the HASP and the Contingency Plan (related to the LFGES) are in place, sufficient to control risks, and properly implemented.

- ***Implementation of Institutional Controls and Other Measures:*** Access controls are in place at the Site including a fence and a warning sign. The Site fence is in good condition. The State Engineer's Office notified residents in the area of potential contamination in groundwater, when drilling domestic wells. There is no current or planned changes in land use at the site.

- ***Remedial Action Performance:*** The landfill cover system has been effective in isolating waste and contaminants. Small depressions (probably from differential landfill settlement) noted on the cover do not affect the performance or integrity of the cover system. The LFGES is operating as required and on a relatively constant basis, except for periodic shutdowns to facilitate routine maintenance activities. All monitoring programs are being conducted in accordance with all appropriate plans, manuals and reports.

- ***System Operations/O&M:*** System operations procedures are consistent with requirements. Difficulties that have occurred with the landfill cover system and LFGES have been handled properly to date.

- ***Cost of System Operations/O&M:*** No operation nor maintenance costs were provided.

- ***Opportunities for Optimization:*** Given the adequate performance of the LFGES, this five-year review does not identify a need for optimization at this time.

- ***Early Indicators of Potential Remedy Failure:*** No early indicators of potential remedy failure were noted during the review.

Question B: Are the assumptions made at the time of the remedy selection still valid?

- ***Changes in Standards:*** No newly promulgated or modified ARARs that would significantly change the protectiveness of the remedies implemented at the Site were found.

- ***Changes in Exposure Pathways:*** No changes, in the site conditions that affect exposure pathways were identified as part of the five-year review. First, there are no current or planned changes in land use. Second, no new contaminants, sources, or routes of exposure were identified as part of this five-year review. Finally, there is no indication that hydrologic/hydrogeologic conditions are not adequately characterized. Present contaminant levels in groundwater are consistent with expectations at the time of the ROD and sampling data suggests that groundwater contamination underlying the Site has remained within the Site.

- ***Changes in Toxicity and Other Contaminant Characteristics:*** Changes in toxicity and other factors for contaminants of concern since the time of the ROD do not call into question the protectiveness of the remedy.

- ***Changes in Risk Assessment Methodologies:*** Changes in risk assessment methodologies since the time of the ROD do not call into question the protectiveness of the remedy.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No additional information has been identified that would call into question the protectiveness of the remedy.

VIII. Deficiencies

Deficiencies were discovered during the five-year review. None of these are sufficient to warrant a finding of not protective as long as corrective actions are taken. The following are the discovered deficiencies:

1. Low points in sub-header lines of the LFGES caused by differential landfill settlement are restricting drainage from the sub-headers to the condensate sumps, thereby creating intermittent gas flow blockage in the system. 'The blockage has not been significant enough to cause automatic shutdown of the system.

2. Perimeter fence surrounding the landfill was cut in a couple of places near the corner of 50th and Forest.

3. Security chain and lock on the landfill gate, located at the 50th and Forest entrance, were cut on three different occasions.

4. One well northeast of and within the Site contained contaminant concentrations above remediation goals.

IX. Recommendations and Follow-up Actions

With EPA oversight, the corresponding recommendations/follow-up actions are as follows:

1. Responsible parties via KRW Consulting will need to locate the partial blockage and make necessary adjustments/repairs by December 31, 2000.

2. Responsible parties via KRW Consulting will need to repair fence by October 31, 2000.

3. Responsible parties via KRW Consulting will need to oversee the gates more aggressively till December 31, 2000 at which time, normal oversight can continue.

4. CDPHE and EPA will need to look for the potential impact, if any, of the construction completion and operation of the Chemical Sales groundwater remedy on the contaminated well. After three groundwater sampling events, CDPHE and EPA will convene to discuss results and options for action for the well. It should be noted that the area is served by a municipal water supply.

X. Protectiveness Statements

OUs 1, 2 and 5 are complete and protective of human health and the environment. OUs 3/6 and 4 are expected to be protective of human health and the environment, and immediate threats have been addressed. The landfill cover and landfill gas extraction systems are operating and functioning as designed. Groundwater monitoring data suggests that the contaminated groundwater underlying the Site has remained within site boundaries.

XI. Next Review

This is a statutory site that requires ongoing five-year reviews. The next review will be conducted within five years of the completion of this five-year review report. The completion date is the date of the signature shown on the signature cover attached to the front of the report.

APPENDICES

Table of Contents

APPENDIX A

Gas Monitoring Probe Data

Sand Creek Landfill Gas Extraction Monitoring
Gas Monitoring Probe 1

Date	Time	% Oxygen	% Methane	Well Pressure (in. WC)	Comments
11/3/1999	10:18	18.40	0.00	0.00	
11/10/1999	13:34	18.50	0.00	0.00	
11/19/1999	10:26	18.70	0.00	0.00	
11/24/1999	14:35	18.40	0.00	0.00	
12/2/1999	9:47	19.40	0.00	0.00	
12/6/1999	11:32	19.00	0.00	0.00	
12/15/1999	9:17	19.20	0.00	-0.01	
12/20/1999	15:42	18.40	0.00	-0.01	
12/28/1999	10:30	18.80	0.00	0.00	
1/7/2000	11:14	19.00	0.00	0.00	
1/12/2000	13:00	18.60	0.00	-0.01	
1/14/2000	12:54	19.00	0.00	-0.01	
1/18/2000	13:00	18.40	0.00	0.00	
1/25/2000	11:47	18.60	0.00	0.00	
2/4/2000	10:07	18.40	0.00	0.00	
2/9/2000	15:40	18.00	0.00	0.00	
2/14/2000	10:45	19.30	0.00	0.00	
2/23/2000	15:12	17.10	0.00	0.00	
3/1/2000	13:23	18.10	0.00	0.00	
3/8/2000	16:05	17.40	0.00	0.00	
3/14/2000	15:08	16.10	0.00	0.00	
3/23/2000	13:15	16.70	0.00	0.00	
3/28/2000	14:28	18.30	0.00	0.00	
4/5/2000	15:03	19.10	0.00	0.00	
4/10/2000	13:55	19.20	0.00	-0.01	
4/17/2000	11:46	18.30	0.00	0.00	
4/24/2000	13:24	18.70	0.00	0.00	
Nov Avg.		18.50	0.00	0.00	
Dec Avg.		18.96	0.00	0.00	
Jan Avg.		18.72	0.00	0.00	
Feb Avg.		18.20	0.00	0.00	
Mar Avg.		17.32	0.00	0.00	
Apr Avg.		18.83	0.00	0.00	
Period Average:		18.42	0.00	0.00	

Notes:

Sand Creek Landfill Gas Extraction Monitoring
Gas Monitoring Probe 3

Date	Time	% Oxygen	% Methane	Well Pressure (in. WC)	Comments
11/3/1999	10:12	18.30	0.00	0.00	
11/10/1999	13:24	18.00	0.00	0.00	
11/19/1999	10:13	18.00	0.00	0.00	
11/24/1999	14:27	18.50	0.00	0.00	
12/2/1999	9:38	19.40	0.00	0.00	
12/6/1999	11:23	19.50	0.00	0.00	
12/15/1999	7:08	19.10	0.00	0.00	
12/20/1999	15:34	19.00	0.00	0.00	
12/28/1999	10:38	19.40	0.00	0.00	
1/7/2000	11:05	19.00	0.00	0.00	
1/12/2000	12:51	19.20	0.00	0.00	
1/14/2000	12:44	19.00	0.00	0.00	
1/18/2000	12:52	19.10	0.00	0.00	
1/25/2000	11:37	18.30	0.00	0.00	
2/4/2000	9:57	18.40	0.00	0.00	
2/9/2000	15:31	18.40	0.00	0.00	
2/14/2000	10:36	19.30	0.00	0.00	
2/23/2000	15:04	17.10	0.00	0.00	
3/1/2000	13:12	18.20	0.00	0.00	
3/8/2000	15:56	18.00	0.00	0.00	
3/14/2000	14:58	18.60	0.00	0.00	
3/23/2000	13:07	18.10	0.00	0.00	
3/28/2000	14:27	18.20	0.00	0.00	
4/5/2000	14:54	17.10	0.00	0.00	
4/10/2000	13:46	18.30	0.00	0.00	
4/17/2000	11:40	17.60	0.00	0.01	
4/24/2000	13:18	17.60	0.00	0.00	
Nov Avg.		18.20	0.00	0.00	
Dec Avg.		19.28	0.00	0.00	
Jan Avg.		18.92	0.00	0.00	
Feb Avg.		18.30	0.00	0.00	
Mar Avg.		18.22	0.00	0.00	
Apr Avg.		17.65	0.00	0.00	
Period Average:		18.66	0.00	0.00	

Notes:

Sand Creek Landfill Gas Extraction Monitoring
Gas Monitoring Probe 5

Date	Time	% Oxygen	% Methane	Well Pressure (in. WC)	Comments
11/3/1999	10:03	17.10	0.00	0.00	
11/10/1999	13:16	16.80	0.00	0.00	
11/19/1999	10:13	18.60	0.00	0.00	
11/24/1999	14:19	18.80	0.00	0.00	
12/2/1999	9:32	19.10	0.00	0.00	
12/6/1999	11:14	19.00	0.00	0.00	
12/15/1999	8:58	19.00	0.00	0.00	
12/20/1999	15:26	18.70	0.00	0.00	
12/28/1999	10:45	18.80	0.00	0.00	
1/7/2000	10:55	18.40	0.00	0.00	
1/12/2000	12:42	18.20	0.00	0.00	
1/14/2000	12:37	18.90	0.00	0.01	
1/18/2000	12:43	18.80	0.00	0.01	
1/25/2000	11:29	19.50	0.00	0.00	
2/4/2000	9:48	19.20	0.00	0.01	
2/9/2000	15:22	19.00	0.00	0.00	
2/14/2000	10:28	19.90	0.00	0.00	
2/23/2000	14:53	19.40	0.00	0.00	
3/1/2000	13:02	18.10	0.00	0.00	
3/8/2000	15:48	19.20	0.00	0.00	
3/14/2000	14:50	18.00	0.00	0.00	
3/23/2000	12:58	18.10	0.00	0.00	
3/28/2000	14:13	19.60	0.00	0.00	
4/5/2000	14:44	18.90	0.00	0.00	
4/10/2000	13:36	19.10	0.00	0.00	
4/17/2000	11:34	19.40	0.00	0.01	
4/24/2000	13:11	19.70	0.00	0.00	
Nov Avg.		17.83	0.00	0.00	
Dec Avg.		18.92	0.00	0.00	
Jan Avg.		18.76	0.00	0.00	
Feb Avg.		19.38	0.00	0.00	
Mar Avg.		18.60	0.00	0.00	
Apr Avg.		19.28	0.00	0.00	
Period Average:		18.69	0.00	0.00	

Notes:

Sand Creek Landfill Gas Extraction Monitoring
Gas Monitoring Probe 7

Date	Time	% Oxygen	% Methane	Well Pressure (in. WC)	Comments
11/3/1999	9:56	19.50	0.00	0.00	
11/10/1999	13:08	19.40	0.00	0.00	
11/19/1999	10:05	19.50	0.00	0.00	
11/24/1999	14:10	19.40	0.00	0.00	
12/2/1999	9:22	17.60	0.00	0.00	
12/6/1999	11:04	18.10	0.00	0.00	
12/15/1999	8:46	18.00	0.00	0.00	
12/20/1999	15:15	18.00	0.00	0.00	
12/28/1999	10:58	17.80	0.00	0.00	
1/7/2000	10:46	18.20	0.00	0.01	
1/12/2000	12:34	17.90	0.00	0.00	
1/14/2000	12:35	16.60	0.00	-0.01	
1/18/2000	12:37	20.40	0.00	0.01	
1/25/2000	11:21	17.40	0.00	0.00	
2/4/2000	9:40	17.80	0.00	0.01	
2/9/2000	15:13	17.40	0.00	0.00	
2/14/2000	10:23	18.00	0.00	0.00	
2/23/2000	14:43	18.10	0.00	0.01	
3/1/2000	12:54	17.80	0.00	0.00	
3/8/2000	15:38	17.50	0.00	0.00	
3/14/2000	14:40	16.70	0.00	-0.01	
3/23/2000	12:47	17.10	0.00	0.00	
3/28/2000	14:02	17.70	0.00	0.01	
4/5/2000	14:33	18.10	0.00	0.01	
4/10/2000	13:25	17.80	0.00	0.00	
4/17/2000	11:26	18.20	0.00	0.01	
4/24/2000	13:03	17.60	0.00	0.02	
Nov Avg.		19.45	0.00	0.00	
Dec Avg.		17.90	0.00	0.00	
Jan Avg.		18.10	0.00	0.00	
Feb Avg.		17.83	0.00	0.01	
Mar Avg.		17.36	0.00	0.00	
Apr Avg.		17.93	0.00	0.01	
Period Average:		18.10	0.00	0.00	

Notes:

Sand Creek Landfill Gas Extraction Monitoring
Gas Monitoring Probe 9

Date	Time	% Oxygen	% Methane	Well Pressure (in. WC)	Comments
11/3/1999	12:03	14.30	0.00	0.01	
11/10/1999	14:35	13.50	0.00	0.01	
11/19/1999	11:51	15.10	0.00	0.00	
11/24/1999	15:47	14.10	0.00	0.00	
12/2/1999	11:33	16.20	0.00	0.00	
12/6/1999	12:53	16.50	0.00	0.00	
12/15/1999	10:39	16.00	0.00	0.00	
12/20/1999	16:52	16.00	0.00	0.01	
12/28/1999	11:19	15.80	0.00	0.00	
1/7/2000	12:20	16.20	0.00	0.00	
1/12/2000	14:01	18.10	0.00	0.00	
1/14/2000	14:06	16.10	0.00	0.01	
1/18/2000	14:11	16.00	0.00	0.00	
1/25/2000	13:24	16.40	0.00	0.01	
2/4/2000	11:23	17.10	0.00	0.01	
2/9/2000	17:01	16.80	0.00	0.00	
2/14/2000	11:48	17.00	0.00	0.01	
2/23/2000	16:27	16.10	0.00	0.01	
3/1/2000	14:47	16.80	0.00	0.00	
3/10/2000	9:40	18.10	0.00	0.00	
3/14/2000	16:20	15.80	0.00	0.00	
3/23/2000	14:32	16.20	0.00	0.00	
3/28/2000	15:39	18.00	0.00	0.00	
4/5/2000	15:18	17.80	0.00	0.00	
4/10/2000	15:23	20.20	0.00	0.00	
4/17/2000	12:52	19.50	0.00	0.00	
4/24/2000	12:22	19.80	0.00	0.00	
Nov Avg.		14.25	0.00	0.01	
Dec Avg.		16.10	0.00	0.00	
Jan Avg.		16.56	0.00	0.00	
Feb Avg.		16.75	0.00	0.01	
Mar Avg.		16.98	0.00	0.00	
Apr Avg.		19.33	0.00	0.00	
Period Average:		16.65	0.00	0.00	

Notes:

Sand Creek Landfill Gas Extraction Monitoring
Gas Monitoring Probe 11

Date	Time	% Oxygen	% Methane	Well Pressure (in. WC)	Comments
11/3/1999	9:37	9.90	0.00	0.03	
11/10/1999	12:53	12.10	0.00	-0.01	
11/19/1999	9:59	20.00	0.00	-0.01	
11/24/1999	13:58	17.00	0.00	-0.01	
12/2/1999	9:12	20.00	0.00	-0.07	
12/6/1999	10:53	21.10	0.00	-0.06	
12/15/1999	8:32	20.80	0.00	-0.03	
12/20/1999	15:07	18.50	0.00	-0.01	
12/28/1999	11:15	19.00	0.00	0.00	
1/7/2000	10:34	19.50	0.00	-0.01	
1/12/2000	12:26	19.70	0.00	-0.01	
1/14/2000	12:16	12.60	0.00	-0.12	
1/18/2000	12:27	9.90	0.00	0.14	
1/25/2000	11:10	9.90	0.00	0.01	
2/4/2000	9:29	9.00	0.00	0.05	
2/9/2000	15:03	10.00	0.00	0.02	
2/14/2000	10:14	10.70	0.00	-0.01	
2/23/2000	14:34	6.10	0.00	-0.01	
3/1/2000	12:44	9.50	0.00	0.00	
3/8/2000	15:27	10.20	0.00	-0.01	
3/14/2000	14:28	7.20	0.00	-0.03	
3/23/2000	12:34	9.40	0.00	0.01	
3/28/2000	13:52	3.50	0.00	0.16	
4/5/2000	14:22	5.30	0.00	0.07	
4/10/2000	13:12	10.40	0.00	-0.03	
4/17/2000	11:19	9.00	0.00	0.04	
4/24/2000	12:02	9.40	0.00	0.07	
Nov Avg.		14.75	0.00	0.00	
Dec Avg.		19.88	0.00	-0.03	
Jan Avg.		14.32	0.00	0.05	
Feb Avg.		8.95	0.00	0.01	
Mar Avg.		7.96	0.00	0.04	
Apr Avg.		8.53	0.00	0.04	
Period Average:		12.58	0.00	0.02	
Notes:					

Sand Creek Landfill Gas Extraction Monitoring
Gas Monitoring Probe 13

Date	Time	% Oxygen	% Methane	Well Pressure (in. WC)	Comments
11/3/1999	11:45	20.10	0.00	0.01	
11/10/1999	14:15	20.00	0.00	0.00	
11/19/1999	11:14	20.00	0.00	0.00	
11/24/1999	15:18	20.00	0.00	0.00	
12/2/1999	11:18	20.30	0.00	0.00	
12/6/1999	12:23	20.00	0.00	0.00	
12/15/1999	10:09	20.00	0.00	0.00	
12/20/1999	16:26	20.00	0.00	0.00	
12/28/1999	11:38	20.10	0.00	0.00	
1/7/2000	11:59	20.00	0.00	0.00	
1/12/2000	13:52	20.30	0.00	-0.01	
1/14/2000	13:42	19.20	0.00	0.00	
1/18/2000	13:47	20.00	0.00	0.00	
1/25/2000	13:08	19.50	0.00	-0.02	
2/4/2000	10:54	19.20	0.00	-0.01	
2/9/2000	16:30	19.20	0.00	-0.01	
2/14/2000	11:31	20.00	0.00	-0.05	
2/23/2000	16:01	19.60	0.00	-0.01	
3/1/2000	14:16	19.50	0.00	0.00	
3/10/2000	9:13	20.10	0.00	0.00	
3/14/2000	15:54	19.20	0.00	0.00	
3/23/2000	14:04	19.50	0.00	0.00	
3/28/2000	15:22	20.40	0.00	0.00	
4/5/2000	15:50	19.80	0.00	0.00	
4/10/2000	14:45	19.70	0.00	0.00	
4/17/2000	12:28	19.50	0.00	0.00	
4/24/2000	14:01	20.20	0.00	0.01	
Nov Avg.		20.03	0.00	0.00	
Dec Avg.		20.08	0.00	0.00	
Jan Avg.		19.80	0.00	-0.01	
Feb Avg.		19.50	0.00	-0.02	
Mar Avg.		19.74	0.00	0.00	
Apr Avg.		19.80	0.00	0.00	
Period Average:		19.83	0.00	0.00	

Notes:

Sand Creek Landfill Gas Extraction Monitoring
Gas Monitoring Probe 15

Date	Time	% Oxygen	% Methane	Well Pressure (in. WC)	Comments
11/3/1999	10:57	15.70	0.00	0.01	
11/10/1999	14:08	13.10	0.00	0.01	
11/19/1999	11:05	14.80	0.00	0.01	
11/24/1999	15:09	15.00	0.00	0.01	
12/2/1999	10:26	16.50	0.00	0.02	
12/6/1999	12:13	16.30	0.00	0.01	
12/15/1999	9:59	16.00	0.00	0.01	
12/20/1999	16:18	17.40	0.00	0.01	
12/28/1999	10:01	16.80	0.00	0.00	
1/7/2000	11:51	17.00	0.00	0.00	
1/12/2000	13:29	17.30	0.00	0.00	
1/14/2000	13:35	14.50	0.00	0.00	
1/18/2000	13:37	14.40	0.00	-0.01	
1/25/2000	12:24	16.00	0.00	0.02	
2/4/2000	10:46	16.10	0.00	0.01	
2/9/2000	16:21	16.00	0.00	0.01	
2/14/2000	11:24	16.00	0.00	0.01	
2/23/2000	14:52	16.10	0.00	0.01	
3/1/2000	14:06	16.00	0.00	0.01	
3/10/2000	9:04	17.10	0.00	0.01	
3/14/2000	15:47	16.00	0.00	0.01	
3/23/2000	13:56	16.50	0.00	0.01	
3/28/2000	15:15	18.60	0.00	0.00	
4/5/2000	15:41	17.90	0.00	0.01	
4/10/2000	14:34	18.30	0.00	0.01	
4/17/2000	12:20	18.00	0.00	0.00	
4/24/2000	13:52	20.00	0.00	0.00	
Nov Avg.		14.65	0.00	0.01	
Dec Avg.		16.60	0.00	0.01	
Jan Avg.		15.84	0.00	0.00	
Feb Avg.		16.05	0.00	0.01	
Mar Avg.		16.84	0.00	0.01	
Apr Avg.		18.55	0.00	0.01	
Period Average:		16.42	0.00	0.01	
Notes:					

Sand Creek Landfill Gas Extraction Monitoring
Gas Monitoring Probe 17

Date	Time	% Oxygen	% Methane	Well Pressure (in. WC)	Comments
11/3/1999	10:51	10.60	0.00	0.02	
11/10/1999	13:59	11.10	0.00	0.01	
11/19/1999	10:56	12.20	0.00	0.01	
11/24/1999	15:00	12.00	0.00	0.01	
12/2/1999	10:19	13.40	0.00	0.00	
12/6/1999	12:02	13.00	0.00	0.01	
12/15/1999	9:50	13.00	0.00	0.00	
12/20/1999	15:09	13.00	0.00	0.01	
12/28/1999	10:08	12.80	0.00	0.00	
1/7/2000	11:42	12.50	0.00	0.00	
1/12/2000	13:21	14.10	0.00	0.00	
1/14/2000	13:24	13.20	0.00	0.01	
1/18/2000	13:27	14.00	0.00	0.01	
1/25/2000	12:13	12.80	0.00	0.02	
2/4/2000	10:34	13.10	0.00	0.02	
2/9/2000	16:11	13.00	0.00	0.01	
2/14/2000	11:16	12.90	0.00	0.01	
2/23/2000	15:43	12.80	0.00	0.01	
3/1/2000	13:55	13.50	0.00	0.01	
3/10/2000	8:55	14.10	0.00	0.01	
3/14/2000	15:39	13.20	0.00	0.00	
3/23/2000	13:46	13.90	0.00	0.00	
3/28/2000	15:09	19.30	0.00	0.00	
4/5/2000	15:33	18.10	0.00	0.00	
4/10/2000	14:26	17.00	0.00	0.00	
4/17/2000	12:11	17.90	0.00	0.00	
4/24/2000	13:46	17.50	0.00	0.00	
Feb Avg.		11.48	0.00	0.01	
Mar Avg.		13.04	0.00	0.00	
Apr Avg.		13.32	0.00	0.01	
Feb Avg.		12.95	0.00	0.01	
Mar Avg.		14.80	0.00	0.00	
Apr Avg.		17.63	0.00	0.00	
Period Average:		13.85	0.00	0.01	

Notes:

Sand Creek Landfill Gas Extraction Monitoring
Gas Monitoring Probe 19

Date	Time	% Oxygen	% Methane	Well Pressure (in. WC)	Comments
11/3/1999	10:31	19.50	0.00	0.03	
11/10/1999	13:51	18.50	0.00	0.01	
11/19/1999	10:47	19.00	0.00	0.01	
11/24/1999	14:51	18.90	0.00	-0.01	
12/2/1999	10:10	20.70	0.00	0.01	
12/6/1999	11:52	19.50	0.00	-0.01	
12/15/1999	9:40	19.00	0.00	-0.01	
12/20/1999	15:58	19.80	0.00	-0.01	
12/28/1999	10:14	19.60	0.00	0.00	
1/7/2000	11:33	19.00	0.00	-0.01	
1/12/2000	13:15	20.10	0.00	-0.02	
1/14/2000	13:15	20.00	0.00	-0.01	
1/18/2000	13:19	20.00	0.00	-0.01	
1/25/2000	12:03	18.40	0.00	0.04	
2/4/2000	10:26	19.10	0.00	0.02	
2/9/2000	16:02	19.00	0.00	0.01	
2/14/2000	11:03	18.50	0.00	0.02	
2/23/2000	15:34	17.10	0.00	0.01	
3/1/2000	13:46	18.20	0.00	0.01	
3/10/2000	8:46	20.00	0.00	0.00	
3/14/2000	15:30	17.20	0.00	0.00	
3/23/2000	13:38	18.20	0.00	0.00	
3/28/2000	14:44	16.60	0.00	0.02	
4/5/2000	15:25	17.80	0.00	0.00	
4/10/2000	14:16	17.20	0.00	0.00	
4/17/2000	12:03	17.00	0.00	0.00	
4/24/2000	13:40	19.00	0.00	0.00	
Nov Avg.		18.98	0.00	0.01	
Dec Avg.		19.72	0.00	0.00	
Jan Avg.		19.50	0.00	0.00	
Feb Avg.		18.43	0.00	0.02	
Mar Avg.		18.04	0.00	0.01	
Apr Avg.		17.75	0.00	0.00	
Period Average:		18.77	0.00	0.00	

Notes:

Sand Creek Landfill Gas Extraction Monitoring
Gas Monitoring Probe 21

Date	Time	% Oxygen	% Methane	Well Pressure (in. WC)	Comments
11/3/1999	10:25	11.10	0.00	-0.01	
11/10/1999	13:41	12.30	0.00	-0.01	
11/19/1999	10:36	14.20	0.00	-0.01	
11/24/1999	14:44	14.00	0.00	-0.01	
12/2/1999	9:57	20.10	0.00	0.00	
12/6/1999	11:41	19.00	0.00	0.00	
12/15/1999	9:27	18.50	0.00	-0.01	
12/20/1999	15:50	18.00	0.00	-0.01	
12/28/1999	10:22	18.40	0.00	0.00	
1/7/2000	11:24	18.00	0.00	-0.01	
1/12/2000	13:07	18.40	0.00	0.00	
1/14/2000	13:03	18.30	0.00	-0.01	
1/18/2000	13:09	18.50	0.00	-0.01	
1/25/2000	11:54	10.90	0.00	-0.02	
2/4/2000	10:16	11.10	0.00	-0.01	
2/9/2000	15:20	12.10	0.00	-0.01	
2/14/2000	10.55	12.60	0.00	-0.02	
2/23/2000	15:20	11.10	0.00	-0.01	
3/1/2000	13:32	13.10	0.00	-0.01	
3/8/2000	16:15	14.40	0.00	-0.01	
3/14/2000	15:17	11.50	0.00	-0.01	
3/23/2000	13:24	12.10	0.00	-0.01	
3/28/2000	14:35	7.30	0.00	0.00	
4/5/2000	15:13	8.90	0.00	-0.01	
4/10/2000	14:05	9.30	0.00	0.00	
4/17/2000	11:53	7.80	0.00	0.02	
4/24/2000	13:34	9.40	0.00	0.03	
Nov Avg.		12.90	0.00	-0.01	
Dec Avg.		18.80	0.00	0.00	
Jan Avg.		16.82	0.00	-0.01	
Feb Avg.		11.73	0.00	-0.01	
Mar Avg.		11.68	0.00	-0.01	
Apr Avg.		8.85	0.00	0.01	
Period Average:		13.72	0.00	-0.01	
Notes:					

Sand Creek Landfill Gas Extraction Monitoring
Gas Monitoring Probe 23

Date	Time	% Oxygen	% Methane	Well Pressure (in. WC)	Comments
11/3/1999	11:51	16.50	0.00	0.00	
11/10/1999	14:18	16.90	0.00	0.00	
11/19/1999	11:22	17.50	0.00	0.00	
11/24/1999	15:22	17.50	0.00	0.00	
12/2/1999	11:19	16.90	0.00	0.00	
12/6/1999	12:28	16.00	0.00	0.00	
12/15/1999	10:14	17.10	0.00	0.00	
12/20/1999	16:30	16.90	0.00	0.00	
12/28/1999	11:35	17.10	0.00	0.00	
1/7/2000	12:03	17.40	0.00	0.00	
1/12/2000	14:09	17.60	0.00	0.00	
1/14/2000	13:44	16.60	0.00	0.00	
1/18/2000	13:50	16.60	0.00	0.00	
1/25/2000	13:10	15.00	0.00	0.00	
2/4/2000	10:58	16.10	0.00	0.00	
2/9/2000	16:36	15.70	0.00	0.00	
2/14/2000	11:32	16.90	0.00	0.00	
2/23/2000	16:05	15.40	0.00	0.00	
3/1/2000	14:21	16.90	0.00	0.00	
3/10/2000	9:17	17.80	0.00	0.00	
3/14/2000	15:58	15.80	0.00	0.00	
3/23/2000	14:08	16.10	0.00	0.00	
3/28/2000	15:24	18.20	0.00	-0.01	
4/5/2000	15:54	18.00	0.00	0.00	
4/10/2000	14:58	16.40	0.00	0.00	
4/17/2000	12:31	18.20	0.00	0.00	
4/24/2000	14:05	19.20	0.00	0.00	
Nov Avg.		17.10	0.00	0.00	
Dec Avg.		16.80	0.00	0.00	
Jan Avg.		16.64	0.00	0.00	
Feb Avg.		16.03	0.00	0.00	
Mar Avg.		16.96	0.00	0.00	
Apr Avg.		17.95	0.00	0.00	
Period Average:		16.90	0.00	0.00	

Notes:

Sand Creek Landfill Gas Extraction Monitoring
Gas Monitoring Probe 25

Date	Time	% Oxygen	% Methane	Well Pressure (in. WC)	Comments
11/3/1999	11:58	19.90	0.00	0.02	
11/10/1999	14:28	19.50	0.00	0.01	
11/19/1999	11:28	20.10	0.00	0.00	
11/24/1999	15:36	19.50	0.00	0.01	
12/2/1999	11:25	19.80	0.00	0.00	
12/6/1999	12:43	19.00	0.00	-0.01	
12/15/1999	10:28	19.00	0.00	-0.01	
12/20/1999	16:42	19.50	0.00	-0.01	
12/28/1999	11:26	19.00	0.00	0.00	
1/7/2000	12:11	19.10	0.00	0.00	
1/12/2000	13:57	20.10	0.00	0.00	
1/14/2000	13:55	17.40	0.00	0.00	
1/18/2000	14:02	18.10	0.00	0.01	
1/25/2000	13:17	18.80	0.00	0.02	
2/4/2000	11:13	18.90	0.00	0.01	
2/9/2000	16:50	18.80	0.00	0.01	
2/14/2000	11:40	19.10	0.00	0.00	
2/23/2000	16:17	17.90	0.00	0.01	
3/1/2000	14:35	18.10	0.00	0.01	
3/10/2000	9:30	19.50	0.00	0.01	
3/14/2000	16:10	17.50	0.00	0.00	
3/23/2000	14:23	17.50	0.00	0.00	
3/28/2000	15:32	19.00	0.00	0.00	
4/5/2000	16:07	18.80	0.00	0.01	
4/10/2000	15:18	20.00	0.00	0.00	
4/17/2000	12:43	19.80	0.00	0.00	
4/24/2000	14:15	19.10	0.00	0.00	
Nov Avg.		19.75	0.00	0.01	
Dec Avg.		19.26	0.00	-0.01	
Jan Avg.		18.70	0.00	0.01	
Feb Avg.		18.68	0.00	0.01	
Mar Avg.		18.32	0.00	0.00	
Apr Avg.		19.43	0.00	0.00	
Period Average:		18.99	0.00	0.00	

Notes:

Sand Creek Landfill Gas Extraction Monitoring
Gas Monitoring Probe 27

Date	Time	% Oxygen	% Methane	Well Pressure (in. WC)	Comments
11/3/1999	12:01	9.90	0.00	0.01	
11/10/1999	14:32	12.20	0.00	0.01	
11/19/1999	11:46	21.10	0.00	0.00	
11/24/1999	15:41	20.00	0.00	0.01	
12/2/1999	11:30	19.70	0.00	0.01	
12/6/1999	12:48	19.50	0.00	0.01	
12/15/1999	10:33	19.00	0.00	-0.01	
12/20/1999	16:48	20.10	0.00	-0.01	
12/28/1999	11:22	19.40	0.00	0.00	
1/7/2000	12:16	20.00	0.00	0.00	
1/12/2000	13:57	20.00	0.00	-0.02	
1/14/2000	14:01	15.10	0.00	-0.02	
1/18/2000	14:06	12.10	0.00	0.01	
1/25/2000	13:21	12.00	0.00	0.01	
2/4/2000	11:18	13.10	0.00	0.01	
2/9/2000	16:55	13.00	0.00	0.00	
2/14/2000	11:44	11.70	0.00	0.00	
2/23/2000	16:21	12.00	0.00	0.00	
3/1/2000	14:40	12.40	0.00	0.00	
3/10/2000	9:34	14.50	0.00	0.00	
3/14/2000	16:14	12.10	0.00	0.00	
3/23/2000	14:27	13.20	0.00	0.00	
3/28/2000	15:36	13.50	0.00	0.00	
4/5/2000	16:13	13.10	0.00	0.00	
4/10/2000	15:20	18.80	0.00	0.00	
4/17/2000	12:48	14.60	0.00	0.00	
4/24/2000	14:19	18.60	0.00	0.00	
Nov Avg.		15.80	0.00	0.01	
Dec Avg.		19.54	0.00	0.00	
Jan Avg.		15.84	0.00	0.00	
Feb Avg.		12.45	0.00	0.00	
Mar Avg.		13.14	0.00	0.00	
Apr Avg.		16.28	0.00	0.00	
Period Average:		15.58	0.00	0.00	

Notes:

APPENDIX B

Landfill Groundwater Monitoring Data

Table B1: Summary of Water-Level Elevation Data, 48th and Holly Landfill

	Date											
Well	**9/94**	**3/95**	**9/95**	**3/96**	**9/96**	**3/97**	**9/97**	**3/98**	**9/98**	**3/99**	**9/99**	**3/00**
L-2	5201.11	5201.01	5201.15	5200.9	5200.89	5200.59	5200.65	5200.77	5200.95	5200.81	5200.94	5200.81
L-3	5161.65	5161.4	5162.12	5161.65	5162.27	5162.17	5163.64	5163.16	5164.09	5163.16	5164.38	5163.41
L-4	5187.07	5186.74	5187.25	5187.07	5187.22	5186.7	5187.14	5186.97	5187.34	5187.04	5187.48	5186.99
L-14	5185.91	5185.77	5186.2	5186.06	5186.23	5185.84	5186.25	5186.14	5186.36	5186.12	5186.48	5186.18
L-15	5190.16	na	na	na	na	na	na	na	na	na	na	na
SC-2B	5167.55	5167.5	5167.81	5167.66	5167.82	5167.68	5168.6	5168.45	5169.10	5168.38	5169.23	5168.76
SC-5B	5158.76	5158.56	5159.21	5158.79	5159.37	5159.23	5160.62	5160.22	5161.02	5160.18	5161.28	5160.43
SC-9B	5159.33	5159	5159.83	5159.29	5159.98	5159.84	5161.36	5160.86	5161.78	5160.81	5162.11	5160.07
FIT-MW3	5203.57	5203.15	n a	5202.97	5202.63	5202.32	5202.53	5202.45	5202.86	5202.55	5202.95	5202.73

na Not applicable - water level below top of dedicated pump.

Note: Water elevations are in units of feet

Table B3: Analytical Results for Monitoring Well FIT-MW3

	Sample Date																		
Analyte	**5/31/86**	**10/6/86**	**1/28/87**	**5/9/87**	**11/3/89**	**9/7/90***	**4/10/91**	**9/94**	**3/95**	**9/95**	**3/96**	**9/96**	**3/97**	**9/97**	**3/98**	**9/98**	**3/99**	**9/99**	**3/00**
Antimony	NA				NA	35 UN	35.3 B	7.6 BJ	12 B	NS	1.6 UB	2 U	5.1 U	2.9 U	10 U	4.2 U	5.2 U	3.7 U	5.4 U
Arsenic	NA				NA	2.9 BWN	1 UNW	1.5 UJ	3.4 U	NS	4 U	2.7 U	4.2 U	2.5 U	4 U	1.3 U	2.9 UJ	5.2 U	8.7 U
Manganese	NA	1660	NA	NA	NA	5640	2.3 B	3.2 BEJ	3.6 B	NS	1 UB	0.3 U	0.3 U	0.4 U	5.3 UB	1.8 U	1.4 U	1.1 U	1.6 U
1,1,1-Trichloroethane	120	120	90	66	295	500 D	250 E		80	NS	54	70	54	64	45	59	41	29	35
1,1-Dichloroethene	5 U	5 U	19 J	3 J	49	51	31		16	NS	12	18	17	26	18	24	18	15	19
1,2-Dichlorethene (total)	44	43 J	19 J	5 U	1 U	23 S	24		18	NS	19	18	23	23	16	20	17	17	16
Benzene	5 U	5 U	5 U	5 U	NA	5 U	0.7 J		10 U	NS	10 U	10 U	11 U	19 U	8 U	10 U	9 U	10 U	15 U
Chloroform	5 U	5 U	5 U	5 U	0.5 U	5 U	0.7 UBJ		10 U	NS	10 U	10 U	11 U	19 U	8 U	10 U	9 U	10 U	15 U
Tetrachloroethene (PCE)	670	710	500	444	626	1500 D	120 BE		210	NS	150	210	180	230	200	300 D	210	170	200
Trichloroethene (TCE)	1500	1400	1100	678	1172	970 D	220 E		150	NS	110	160	130	150	120	140	120	100	100
Vinyl chloride	10 U	10 U	10 U	10 U	1.8 U	10 U	2 U		10 U	NS	10 U	10 U	11 U	19 U	8 U	10 U	9 U	10 U	15 U

Units are micrograms per liter.
See Table B13 for an explanation of data qualifiers.
The concentrations for antimony, arsenic, and manganese are dissolved unless otherwise noted.

NS Not sampled. Access to the well could not be obtained.
* Total Metals

Table B5: Analytical Results for Monitoring Well L-3

	Sample Date													
Analyte	**5/29/86**	**4/8/91**	**9/94**	**3/95**	**9/95**	**3/96**	**9/96**	**3/97**	**9/97**	**3/98**	**9/98**	**3/99**	**9/99**	**3/00**
Antimony	29 U	55.2 B	2 U	14.3 B	2.4 U	1.7 UB	2 U	5.1 U	2.9 U	10 U	4.2 U	3.9 U	3.7 U	5.4 U
Arsenic	10 U	2.1 B	4.4 U	3.4 U	6.3 U	4 U	2.7 U	4.2 U	2.5 U	4 U	1.3 U	2.9 U	5.2 U	2.4 U
Manganese	4010	9820	6460	8900	4880	6710	7640	5090	3250	2220	1160	738	628	647
1,1,1-Trichloroethane	5 U	1 U	10 U	1 U	1 U	1 U	1 U	0.4 J	1 U	1 U	10 U	1 U	1 U	1 U
1,1-Dichloroethene	5 U	1 U	10 U	1 U	1 U	1 U	1 U	0.7 J	1 U	1 U	10 U	1 U	1 U	1 U
1,2-Dichloroethene (total)	3.2 J	3	10 U	0.5 J	0.3 J	1 U	1 U	0.8 J	0.3 J	1 U	10 U	1 U	1 U	1 U
Benzene	3.3 J	4	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U
Chloroform	5 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U
Tetrachloroethene (PCE)	5 U	0.1 J	10 U	1 U	0.3 J	0.6 J	1 U	3	1	1	10 U	2	2	3
Trichloroethene (TCE)	1.1 J	0.4 J	10 U	1 U	1 U	1	1 U	3	2	2	10 U	2	1	1
Vinyl chloride	7.1 J	13	10 U	2	0.3 J	1 U	2	1 U	1 U	1 U	10 U	1 U	1 U	1 U

Units are micrograms per liter.
See Table B13 for an explanation of data qualifiers.
The concentrations for antimony, arsenic, and manganese are dissolved unless otherwise noted.

Shaded areas indicate compounds that were detected equal to or above the historical maximum detected value.

Table B7: Analytical Results for Monitoring Well L-14

	Sample Date												
Analyte	**4/9/91**	**9/94**	**3/95**	**9/95**	**3/96**	**9/96**	**3/97**	**9/97**	**3/98**	**9/98**	**3/99**	**9/99**	**3/00**
Antimony	57.9 B	2.3 B	4.9 B	2.4 U	4.2 UB	2 U	5.1 U	2.9 U	10 U	8.5 U	3.9 U	3.7 U	5.4 U
Arsenic	1 UNW	2.5 U	3.4 U	2.1 U	4 U	2.7 U	4.2 U	2.5 U	4 U	1.3 U	2.9 U	5.2 U	2.9 BU
Manganese	1180	1260	1050	1230	1230	1230	1150	1210	1060	1060	1010	875	1160
1,1,1-Trichloroethane	10	6 J	5 J	4 J	3 J	3	4 J	4	3.4	3 J	4	2 J	4 J
1,1-Dichloroethene	14	28	19	17	11	14	16	19	14	14	11	7	15
1,2-Dichloroethene (total)	36	110	98	90	62	14	85	90	72	74	67	47	83
Benzene	1 U	10 U	7 U	5 U	4 U	2 U	5 U	4 U	3.1 U	10 U	4 U	2 U	5 U
Chloroform	1 U	10 U	7 U	5 U	4 U	2 U	5 U	4 U	3.1 U	10 U	4 U	2 U	5 U
Tetrachloroethene (PCE)	10 B	7 J	8	7 J	6	7	9	9	10	11	9	5	10
Trichloroethene (TCE)	11	6 J	5 J	5	4 J	5	6	6	5.9	6 J	6	4	6
Vinyl chloride	2 U	6 J	3 J	3 J	2 J	2	2 J	3 J	1.9 J	2 J	2 J	1 J	2 J

Units are micrograms per liter.
See Table B13 for an explanation of data qualifiers.
The concentrations for antimony, arsenic, and manganese are dissolved unless otherwise noted.

Table B9: Analytical Results for Monitoring Well SC-2B-

	Sample Date																
Analyte	**5/8/86**	**9/9/86**	**1/13/87**	**5/16/87**	**4/2/91**	**9/94**	**3/95**	**9/95**	**3/96**	**9/96**	**3/97**	**9/97**	**3/98**	**9/98**	**3/99**	**9/99**	**3/00**
Antimony	19 U	40 U			24 U	3.1 B	10.2 B	2.4 U	2.4 UB	2 U	5.1 U	2.9 U	10 U	4.5 U	5.2 U	3.7 U	5.4 U
Arsenic	10 U	10 U			1.3 B	2.3 U	3.4 U	2.9 U	4 U	2.7 U	4.2 U	2.5 U	4 U	1.3 U	2.9 UJ	5.2 U	2.4 U
Manganese	16 EJ	12 EJ		NA	151 E	2 B	3.6 B	1.9 B	1.1 UB	3.1 BU	0.3 U	0.4 U	1.1 U	1.8 U	1.4 U	1.1 U	2.5 B
1,1,1-Trichloroethane	5 U	5 UJ	5 UJ	5 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U
1,1-Dichloroethene	5 U	5 U	5 UJ	5 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U
1,2-Dichlorethene (total)	5 U	5 U	5 UJ	5 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U
Benzene	5 U	2.7 J	5 UJ	5 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U
Chloroform	5 U	5 U	5 UJ	5 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U	0.2 J	1 U	10 U	1 U	0.3 J	1 U
Tetrachloroethene (PCE)	1.8 J	2.4 UJ	5 UJ	2 J	1	2 J	1	1 J	1	1	1	2	2	4 J	4	5	5
Trichloroethene (TCE)	6	5.8 J	5 UJ	6	4	4 J	3	4	4	4	3	4	3	4 J	3	3	3
Vinyl chloride	10 U	10 U	10 UJ	10 U	2 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U

Units are micrograms per liter.
See Table B13 for an explanation of data qualifiers.
The concentrations for antimony, arsenic, and manganese are dissolved unless otherwise noted.

Shaded areas indicate compounds that were detected equal to or above the historical maximum detected value.

Table B11: Analytical Results for Monitoring Well SC-9B

	Sample Date																
Analyte	**5/29/86**	**9/10/86**	**1/27/87**	**5/6/87**	**4/3/91**	**9/94**	**3/95**	**9/95**	**3/96**	**9/96**	**3/97**	**9/97**	**3/98**	**9/98**	**3/99**	**9/99**	**3/00**
Antimony	19 U	40 U			87.1	2.2 B	2.8 B	2.4 U	1.3 UB	2 U	5.1 U	2.9 U	10 U	4.2 U	3.9 U	3.7 U	5.4 U
Arsenic	10 U	10 U			1 U	1.5 U	3.4 U	2.1 U	4 U	2.7 U	4.2 U	2.5 U	4 U	1.3 U	2.9 U	5.2 U	9 BU
Manganese	8548 EJ	7600 EJ			2240	2270	2250	738	1750	784	1100	10.5 B	33	4.4 J	469	1.1 U	1.6 U
1,1,1-Trichloroethane	3.8 J	5 U	3 J	5 U	3	1 J	5 U	0.7 J	4 U	3 U	2 U	2 J	1.4 J	10 U	2 J	1 J	3 J
1,1-Dichloroethene	5 U	5 U	4 J	5 U	7	10	20	3	7	8	4	8	5.7	7 J	5	5	7
1,2-Dichlorethene (total)	5.2	5	23	12	33	45	93	18	39	8	34	46	38	43	42	33	56
Benzene	3.1 J	3 J	5	2 J	2	10 U	5 U	1 U	4 U	3 U	2 U	3 U	1.6 U	10 U	2 U	2 U	3 U
Chloroform	5 U	5 U	5 U	5 U	1 U	10 U	5 U	1 U	4 U	3 U	2 U	3 U	1.6 U	10 U	2 U	2 U	3 U
Tetrachloroethene (PCE)	5.7	5 U	1 J	5 U	3	2 J	3 J	1 J	2 J	4	2	5	4.2	9 J	5	6	6
Trichloroethene (TCE)	2.7 J	2 J	8	5	4	4 J	8	2	4	5	4	5	4.4	7 J	4	5	4
Vinyl chloride	8.9 J	10 U	18	10 U	2 U	26	22	2	8	7	7	3 U	1.6 U	10 U	2 U	2 U	3 U

Units are micrograms per liter.
See Table B13 for an explanation of data qualifiers.
The concentrations for antimony, arsenic, and manganese are dissolved unless otherwise noted.

Table B13: Data Qualifiers Applied to Analytical Results

Inorganic Qualifiers

B - The reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL) but greater than or equal to the Instrument Detection Limit (IDL).

E - The reported value is estimated because of the presence of interference.

J - The associated value is an estimated quantity.

N - Spiked sample is not within method required control limit.

R - Data are unusable (compound may or may not be present). Resampling and reanalysis are necessary for verification.

S - Method of standard addition used to perform the quantitation.

U - The material was analyzed for but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

W - Post-digestion spike for Furnace AA analysis is out of control limits (85 to 115 percent), while sample absorbance is less than 50 percent of spike absorbance.

* - Duplicate analysis is not within control limits.

Organic Qualifiers

B - Analyte is present in the investigative sample and in the related method blank.

C - Data are estimated because of noncompliance of the associated calibration with method stipulated quality control criteria.

D - Diluted result quantitation was performed after a primary dilution of the investigative sample.

E - Estimated value; concentration of qualified analyte exceeds the calibration range of the analytical method.

J - The associated value is an estimated quantity.

N - Presumptive evidence of presence of material.

R - The data are unusable (compound may or may not be present). Resampling and reanalysis are necessary for verification.

S - Supporting data necessary to rely on this result. Unreliable result without correlation.

U - The material was analyzed for but was not detected. The associated numerical value is the sample quantitation limit.

UB - Sample result is less than 5 times (10 times for common laboratory contaminants) the associated blank result. The sample quantitation limit has been increased as a result of blank contamination.

APPENDIX C

Site-wide Groundwater Monitoring Data

TABLE 1

Ground Water Performance Monitoring Program

Monitoring Well/Surface Water Sample Locations

and Property Owner Contacts for Access

Well Identification	Location	Property Owner/Contract for Access
RW-1	South bank of Sand Creek; access via Jones Fine Sand Co.	Jones Fine Sand; 5400 Forest Street Denver, CO 80022; Attn: Carl Palizzi (303) 289-1428
RW-2	South bank of Sand Creek; access via Jones Fine Sand Co.	Jones Fine Sand; 5400 Forest Street Denver, CO 80022; Attn: Carl Palizzi
RW-3	5425 E. 52nd Avenue; NW corner of Denver Cartage Company lot.	Eugene Ardelt; 8250 E. 40th Avenue Denver, Co 80207 (303) 399-2934
RW-4	5425 E. 52nd Avenus; NW corner of Denver Cartage Company lot.	Eugene Ardelt; 8250 E. 40th Avenue Denver, CO 80207
RW-5	CDOT right-of-way; north of I-270 between mile markers 280 and 290 (access from northbound lane).	CDOT; 5640 E. Atlantic Place Denver, CO 80224; Attn: Rudy Blea (303) 757-9890
SC-3R	East of Dahlia Street/E. 56th Avenue intersection; south of Sand Creek.	L.C. Corporation; c/o John Lafollette 5310 Ward Road, Suite G-07; Arvada CO 80002 (303) 423-8346
SC-6A	East of Gate City Steel building; northeast of the site.	Cedarcryst Properties; 4468 S. Zenobia St. Denver, CO 80236 Attn: David Reida (303) 295-7668
SC-7A	East of Matteson building; west of Dahlia Street.	N/A (on site)
SC-12A	4545 E. 51st Avenue; south side of Tower Beverages of Colorado building.	Tower Beverages of Colorado 4545 E. 51st Avenue
SC-16B	5565 E. 52nd Avenue; north end of FFE lot.	Mike Ligeros; 280 Grape Street Denver, CO 80220 (303) 377-7901
SC-17A	East of Dahlia Street/E. 56th Avenue intersection; south of Sand Creek	L.C Corporation; c/o John Lafollette 5310 Ward Road, Suite G-07; Arvada, Co 80002 (303) 423-8346

TABLE 2

Key Contaminants of Concern

Parameter	Remediation Goal (Fg/L)	Analytical Method	Practical Quantitation Limit (Fg/L)
Benzene	5.0	EPA 8260	2.0
Chlorobenzene	100	EPA 8260	2.0
Chloroform	6.0	EPA 8260	2.0
1,2-Dichlorobenzene	600	EPA 8270	10
1,4-Dichlorobenzene	75	EPA 8270	10
1,1-Dichloroethene	7.0	EPA 8260	2.0
trans-1,2-Dichloroethene	100	EPA 8260	2.0
cis-1,2-Dichloroethene	70	EPA 8260	3.0
Ethylbenzene	680	EPA 8260	2.0
Methylene Chloride	5.0	EPA 8260	2.0
Styrene	100	EPA 8260	2.0
Tetrachloroethene	5.0	EPA 8260	2.0
1,1,1-Trichloroethane	200	EPA 8260	2.0
Trichloroethene	5.0	EPA 8260	2.0
Vinyl Chloride	2.0	EPA 8260	2.0
Dieldrin	0.002	EPA 8081	0.044
4,4'-DDT	0.1	EPA 8081	0.081
Lindane (gamma-BHC)	0.2	EPA 8081	0.025
Antimony	6.0	EPA 7041	3.0
Arsenic	50	EPA 7060	2.0
Beryllium	4.0	EPA 6010	2.0
Lead	50	EPA 7421	2.0
Manganese	50	EPA 6010	2.0
Selenium	50	EPA 7740	2.0

Table 4. Semi-volatile and Volatile Organic Compounds Concentrations (Fg/L)
Sand Creek Superfund Site May 2000 Ground Water Sampling Event

Location	Benzene	Chlorobenzene	Chloroform	1,2,-Dichloro-benzene	1,3-Dichloro-benzene	1,4-Dichloro-benzene	Ethylbenzene	Isopropyl-benzene	n-Propyl benzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Methylene Chloride	Toluene	o-Xylene	m,p-Xylenes
RG	5.0	100	6.0	600	-	75	680	-	-	-	-	5.0	1000	10,000	10,000
SC-6A	98	U 2.0	U 2.0	3.4	U 2.0	2.5	9.5	9.5	7.1	3.0	0.88 J	25 B	0.73 J	U 2.0	2.5
SC-7A	220 D	460 D	U 20	1600 D	27 D	830 D	330 D	45 D	60 D	390 D	27 D	U 50	27 D	36 D	350 D
SC-12A	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2. 0	U 2.0	U 2.0	U 2.0	U 5.0	U 2.0	U 2.0	U 2.0
SC-17A	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 5.0	U 2.0	U 2.0	U 2.0
SC-16B	U 2.0	5.6	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	0.47 JB	U 2.0	U 2.0	U 2.0
SC-21B	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 5.0	U 2.0	U 2.0	U 2.0
SC-3R	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 5.0	U 2.0	U 2.0	U 2.0
RW-1	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 5.0	U 2.0	U 2.0	U 2.0
RW-2	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 5.0	U 2.0	U 2.0	U 2.0
RW-3	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	0.55 JB	U 2.0	U 2.0	U 2.0
RW-4	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 5.0	U 2.0	U 2.0	U 2.0
RW-5	U 2.0	2.5	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	0.58 JB	U 2.0	U 2.0	U 2.0
URS-1	U 10	U 10	U 10	U 10	U 10	U 10	U 10	U 10	U 10	U 10	U 10	U 25	U 10	U 10	U 10
URS-21	1300 D	U 20	U 20	U 20	U 20	U 20	59 D	29 D	27 D	540 D	200 D	U 50	18 DJ	14 DJ	580 D
SW-1	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 5.0	U 2.0	U 2.0	U 2.0
SW-2	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 5.0	U 2.0	U 2.0	U 2.0

1. RG - Remediation Goal
2. U - analyte not detected at the reported limit.
3. B - analyte was detected in the laboratory method blank.
4. D - analyte was diluted to bring within instrument calibration range or to remove matrix interferences.
5. J - analyte was detected above the instrument detection limit but the analytical reporting limit.
6. Shaded areas indicate Remediation Goal exceedances.

Table 6. Pesticide Compounds Concentrations (Fg/L)
Sand Creek Superfund Site May 2000 Ground Water Sampling Event

LOCATION	CPMSO	2,4-D	4,4-DDT	Dieldrin	gammma-BHC (Lindane)
RG	2.0	70	0.1	0.002	0.2
SC-6A	NA	NA	U 0.20	U 0.080	U 0.050
SC-7A	NA	NA	U 0.20	U 0.080	U 0.050
SC-12A	NA	NA	U 0.21	U 0.084	U 0.053
SC-17A	NA	NA	U 0.20	U 0.080	U 0.050
SC-16B	NA	NA	U 0.21	U 0.084	U 0.053
SC-21B	NA	NA	U 0.22	U 0.089	U 0.056
SC-3R	NA	NA	U 0.22	U 0.089	U 0.056
RW-1	NA	NA	U 0.21	U 0.084	U 0.053
RW-2	NA	NA	U 0.21	U 0.084	U 0.053
RW-3	NA	NA	U 0.21	U 0.084	U 0.053
RW-4	NA	NA	U 0.20	U 0.080	U 0.050
RW-5	NA	NA	U 0.21	U 0.084	U 0.053
URS-1	NA	NA	U 0.20	U 0.080	U 0.050
URS-21	NA	NA	U 0.21	U 0.084	U 0.053
SW-1	NA	NA	U 0.21	U 0.084	U 0.053
SW-2	NA	NA	U 0.20	U 0.080	U 0.050

1. RG - Remediation Goal
2. U - analyte not detected at the reported limit.
3. NA - not analyzed.

Table 8

Data Summary Table

Volatile and Semi-volatile Organic Compounds Concentrations (Fg/L)

-Well SC-6A-

Tetrachlrorethene	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	2.2
Trichloroethene	U 2.0	U 2.0	U 2.0	2.1	U 2.0	1.3 J	2.4	1.6 J	1.0 J	1.6 J
1,1-Dichloroethene	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0
1,2-Dichloroethene[1]	19	3.5	3.5	U 2.0	4.0/U 2.0	2.5 J/U 2.0	3.6/U 2.0	2.7/U 2.0	1.2 J/U 2.0	2.7/U 2.0
Benzene	51 J	125	116	100	85	66	150	120	39	98
Chlorobenzene	U 2.0	U 2.0	U2.0	U 2.0	U 2.0	U 3.0	U 2.0	U 2.0	U 2.0	U 2.0
Ethylbenzene	U 2.0	U 2.0	U 2.0	10	7.0	12	14	12	3.9	9.5
Methylene Chloride	20	35	13 B	35	37 B	28 B	45 B	21 B	37	25 B
1,2-Dichlorobenzene	U 10	NA	U 2.0	U 2.0	U 2.0	U 5.0	U 2.0	U 2.0	U 2.0	3.4
1,4-Dichlorobenzene	U 10	NA	U 2.0	U 2.0	U 2.0	1.1 J	U 2.0	U 2.0	U 2.0	2.5
Toluene	U 2.0	9.2	U 2.0	U 2.0	U 2.0	U 1.0	0.92 J	0.80 J	U 2.0	0.73 J
Xylenes[2]	U 2.0	2.3	U 4.0	U 2.0	2.0 J	U 1.0/U 1.0	U 2.0/4.3	U 2.0/4.4	U 2.0/0.78 J	U 2.0/2.5
Date Sampled	9/94	1/95	3/95	6/95	9/95	2/97	11/98	5/99	10/99	5/00

[1]9/95-5/00: cis/trans

[2]2/97-5/00: o/m,p

U - analyte not detected at the reported limit

B - analyte was detected in the laboratory method blank

J - analyte was detected above the instrument detection limit but below the analytical reporting limit

NA - parameter was not analyzed

Shaded areas indicate Remediation Goal exceedances

Table 9

Data Summary Table

Volatile and Semi-volatile Organic Compounds Concentrations (Fg/L)

-Well SC-7A-

Tetrachloroethene	NA	NA	NA	60 E	160 E	300 D	530 D	140	32 D	110 D
Trichloroethene	NA	NA	NA	58 E	160 E	980 D	400 D	9.1	28 D	40 D
1,1-Dichloroethene	NA	NA	NA	U 2.0	5.0	U 50 D	3.8	U 2.0	U 2.0	U 20
1,2-Dichloroethene[1]	NA	NA	NA	2.0	330 E/U 2.0	1300 D/U 50 D	1300 D/U 2.0	21/U 2.0	170 D/U 2.0	570 D/U 20
Benzene	NA	NA	NA	180 E	110 E	220 D	120	U 2.0	19 D	220 D
Chlorobenzene	NA	NA	NA	68 E	87 E	150 D	180	2.2	32 D	460 D
Ethylbenzene	NA	NA	NA	160 E	110 E	260 D	210 D	2.8	82 D	330 D
Methylene Chloride	NA	NA	NA	U 2.0	38	U 50 D	23 B	14 B	U 50	U 50
1,2-Dichlorobenzene	NA	NA	NA	U 2.0	350 E	1900 D	1400 D	37	270 D	1600 D
1,4-Dichlorobenzene	NA	NA	NA	U 2.0	230 E	1100 D	660 D	28	120 D	830 D
Toluene	NA	NA	NA	35	50 E	78 D	41	0.79 J	6.4 DJ	27 D
Xylenes[2]	NA	NA	NA	64	61 E	U 25 D/130 D	23/190	0.46 J/3.2	8.0 DJ/32 D	36 D/350 D
Date Sampled	9/94	1/95	3/95	6/95	9/95	2/97	11/98	5/99	10/99	5/00

[1]9/95-5/00: cis/trans

[2]2/97-5/00: o/m,p

U - analyte not detected at the reported limit

B - analyte was detected in the laboratory method blank

J - analyte was detected above the instrument detection limit but below the analytical reporting limit

NA - parameter was not analyzed

E - concentration of analyte is estimated because it exceeded the calibration range

D - sample was diluted to bring concentration into calibration range or to remove matrix interferences

Shaded areas indicate Remediation Goal exceedances

Table 10

Data Summary Table

Volatile and Semi-volatile Organic Compounds Concentrations (Fg/L)

-Well SC-12A-

Tetrachloroethene	2.0 J	U 2.0	U 2.0	1.9 J	2.0 J	0.98 J	0.92 J	0.76 J	1.6 J	1.3 J
Trichloroethene	5.8	7.2	6.0	5.5	5.0	3.7	2.3	1.9 J	2.4	2.2
1,1-Dichloroethene	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0
1,2-Dichloroethene[1]	U 2.0	U 2.0	U 2.0	U 2.0	4.0/U 2.0	U 3.0/U 2.0	U 2.0/U 2.0	U 2.0/U 2.0	U 2.0/U 2.0	U 2.0/U 2.0
Benzene	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 1.0	U 2.0	U 2.0	U 2.0	U 2.0
Chlorobenzene	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0
Ethylbenzene	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 1.0	U 2.0	U 2.0	U 2.0	U 2.0
Methylene Chloride	U 2.0	U 2.0	U 2.0	U 2.0	38	U 2.0	4.3 JB	8.9 JB	U 10	U 5.0
1,2-Dichlorobenzene	U 2.0	NA	U 2.0	U 2.0	6.0	U 5.0	U 2.0	U 2.0	U 2.0	U 2.0
1,4-Dichlorobenzene	U 2.0	NA	U 2.0	U 2.0	2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0
Toluene	U 2.0	8.7 BJ	U 2.0	U 2.0	U 2.0	U 1.0	U 2.0	U 2.0	U 2.0	U 2.0
Xylenes[2]	U 2.0	U 2.0	U 4.0	U 2.0	U 2.0	U 1.0/U 1.0	U 2.0/U 2.0	U 2.0/U 2.0	U 2.0/U 2.0	U 2.0/U 2.0
Date Sampled	9/94	1/95	3/95	6/95	9/95	2/97	11/98	5/99	10/99	5/00

[1]9/95-5/00: cis/trans

[2]2/97-5/00: o/m,p

U - analyte not detected at the reported limit

B - analyte was detected in the laboratory method blank

J - analyte was detected above the instrument detection limit but below the analytical reporting limit

NA - parameter was not analyzed

Shaded areas indicate Remediation Goal exceedances

Table 12

Data Summary Table

Volatile and Semi-volatile Organic Compounds Concentrations (FG/L)

-Well SC-16B-

Tetrachloroethene	5.4	6.0	6.0	6.0	4.0	4.8	5.2	4.2	6.0	7.1
Trichloroethene	4.9	5.6	6.0	6.0	4.0	3.9	4.7	4.3	4.7	5.3
1,1-Dichloroethene	10	14	15	18	8.0	7.1	14	6.5	8.4	12
1,2-Dichloroethene[1]	U 2.0	62	U 2.0	U 2.0	31/U 2.0	39/U 2.0	46/U 2.0	35/U 2.0	30/U 2.0	42/U 2.0
Benzene	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 1.0	U 2.0	U 2.0	U 2.0	U 2.0
Chlorobenzene	U 2.0	5.5	5.0	6.0	3.0	5.7	4.6	U 2.0	3.5	5.6
Ethylbenzene	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 1.0	U 2.0	U 2.0	U 2.0	U 2.0
Methylene Chloride	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	3.7 B	19 B	1.1 J	U 10	0.47 JB
1,2-Dichlorobenzene	U 10	NA	U 2.0	U 2.0	U 2.0	U 5.0	U 2.0	U 2.0	U 2.0	U 2.0
1,4-Dichlorobenzene	U 10	NA	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0
Toluene	U 2.0	8.1 B	U 2.0	U 2.0	U 2.0	U 1.0	U 2.0	U 2.0	U 2.0	U 2.0
Xylenes[2]	U 2.0	U 2.0	U 4.0	U 2.0	U 2.0	U 1.0/U 1.0	U 2.0/U 2.0	U 2.0/U 2.0	U 2.0/U 2.0	U 2.0/U 2.0
Date Sampled	9/94	1/95	3/95	6/95	9/95	2/97	11/98	5/99	10/99	5/00

[1]9/95-5/00: cis/trans

[2]2/97-5/00: o/m,p

U - analyte not detected at the reported limit

B - analyte was detected in the laboratory method blank

J - analyte was detected above the instrument detection limit but below the analytical reporting limit

NA - parameter was not analyzed

Shaded areas indicate Remediation Goal exceedances

Table 13

Data Summary Table

Volatile and Semi-volatile Organic Compounds Concentrations (Fg/L)

-Well SC-21B-

Tetrachloroethene	U 2.0	2.1	2.0	U 2.0	1.0 J	1.3 J	0.59 J	0.56 J	U 2.0	0.78 J
Trichloroethene	3.0	2.9	3.0	2.5	2.0	1.6 J	1.3 J	0.92 J	0.74 J	1.2 J
1,1-Dichloroethene	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	1.1 J	0.56 J	U 2.0	0.60 J
1,2-Dichloroethene[1]	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 3.0/U 2.0	5.5/U 2.0	3.4/U 2.0	3.2/U 2.0	4.4/U 2.0
Benzene	NA	U 2.0	U 2.0	U 2.0	U 2.0	U 1.0	0.53 J	0.53 J	U 2.0	U 2.0
Chlorobenzene	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	0.43 J	0.43 J	U 2.0	U 2.0
Ethylbenzene	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 1.0	U 2.0	U 2.0	U 2.0	U 2.0
Methylene Chloride	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	2.7 B	2.9 JB	2.9 JB	U 10	U 5.0
1,2-Dichlorobenzene	U 10	NA	U 2.0	U 2.0	U 2.0	U 5.0	U 2.0	U 2.0	U 2.0	U 2.0
1,4-Dichlorobenzene	U 10	NA	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0
Toluene	U 2.0	8.3	U 2.0	U 2.0	U 2.0	U 1.0	U 2.0	U 2.0	U 2.0	U 2.0
Xylenes[2]	U 2.0	U 2.0	U 4.0	U 2.0	U 2.0	U 1.0/U 1.0	U 2.0/U 2.0	U 2.0/U 2.0	U 2.0/U 2.0	U 2.0/U 2.0
Date Sampled	9/94	1/95	3/95	6/95	9/95	2/97	11/98	5/99	10/99	5/00

[1]9/95-5/00: cis/trans

[2]2/97-5/00: o/m,p

U - analyte not detected at the reported limit

B - analyte was detected in the laboratory method blank

J - analyte was detected above the instrument detection limit but below the analytical reporting limit

NA - parameter was not analyzed

Table 15

Data Summary Table

Volatile and Semi-volatile Organic Compounds Concentrations (Fg/L)

-Well RW-1-

Tetrachloroethene	U 2.0	2.2	U 2.0	U 2.0	1.0 J	1.7 J	1.2 J	1.2 J	1.7 J	1.9 J
Trichloroethene	2.6	3.9	4.0	4.6	4.0	1.3 J	1.7 J	1.6 J	2.0	1.8 J
1,1-Dichloroethene	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0
1,2-Dichloroethene[1]	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 3.0/U 2.0	1.1 J/U 2.0	1.0 J/U 2.0	0.93 J/U 2.0	U 2.0/U 2.0
Benzene	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 1.0	U 2.0	U 2.0	U 2.0	U 2.0
Chlorobenzene	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0
Ethylbenzene	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 1.0	U 2.0	U 2.0	U 2.0	U 2.0
Methylene Chloride	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	2.2 B	U 2.0	1.1 J	U 10	U 5.0
1,2-Dichlorobenzene	U 10	NA	U 2.0	U 2.0	U 2.0	U 5.0	U 2.0	U 2.0	U 2.0	U 2.0
1,4-Dichlorobenzene	U 10	NA	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0
Toluene	U 2.0	8.2	U 2.0	U 2.0	U 2.0	U 1.0	U 2.0	U 2.0	U 2.0	U 2.0
Xylenes[2]	U 2.0	U 2.0	U 4.0	U 2.0	U 2.0	U 1.0/U 1.0	U 2.0/U 2.0	U 2.0/U 2.0	U 2.0/U 2.0	U 2.0/U 2.0
Date Sampled	9/94	1/95	3/95	6/95	9/95	2/97	11/98	5/99	10/99	5/00

[1]9/95-5/00: cis/trans

[2]2/97-5/00: o/m,p

U - analyte not detected at the reported limit

B - analyte was detected in the laboratory method blank

J - analyte was detected above the instrument detection limit but below the analytical reporting limit

NA - parameter was not analyzed

Table 17

Data Summary Table

Volatile and Semi-volatile Organic Compounds Concentrations (Fg/L)

-Well RW-3-

Tetrachloroethene	2.1	NA	NA	NA	NA	1.8 J	2.2	1.4 J	U 1.9 J	1.6 J
Trichloroethene	U 2.0	NA	NA	NA	NA	1.8 J	2.1	1.8 J	2.0	1.5 J
1,1-Dichloroethene	U 2.0	NA	NA	NA	NA	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0
1,2-Dichloroethene[1]	U 2.0	NA	NA	NA	NA	U 3.0/U 2.0	0.76/U 2.0	0.53/U 2.0	0.42 J/U 2.0	U 2.0/U 2.0
Benzene	U 2.0	NA	NA	NA	NA	U 1.0	U 2.0	U 2.0	U 2.0	U 2.0
Chlorobenzene	U 2.0	NA	NA	NA	NA	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0
Ethylbenzene	U 2.0	NA	NA	NA	NA	U 1.0	U 2.0	U 2.0	U 2.0	U 2.0
Methylene Chloride	U 2.0	NA	NA	NA	NA	U 2.0	3.1 JB	1.1 J	U 10	0.55 JB
1,2-Dichlorobenzene	U 10	NA	NA	NA	NA	U 5.0	U 2.0	U 2.0	U 2.0	U 2.0
1,4-Dichlorobenzene	U 10	NA	NA	NA	NA	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0
Toluene	U 2.0	NA	NA	NA	NA	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0
Xylenes[2]	U 2.0	NA	NA	NA	NA	U 1.0/U 1.0	U 2.0/U 2.0	U 2.0/U 2.0	U 2.0/U 2.0	U 2.0/U 2.0
Date Sampled	9/94	1/95	3/95	6/95	9/95	2/97	11/98	5/99	10/99	5/00

[1]9/95-5/00: cis/trans

[2]2/97-5/00: o/m,p

U - analyte not detected at the reported limit

B - analyte was detected in the laboratory method blank

J - analyte was detected above the instrument detection limit but below the analytical reporting limit

NA - parameter was not analyzed

Table 19

Data Summary Table

Volatile and Semi-volatile Organic Compounds Concentrations (Fg/L)

-Well RW-5-

Tetrachloroethene	3.9	5.4	5.0	5.0	3.0	2.7	1.8 J	1.8 J	2.0	2.4
Trichloroethene	4.8	7.2	7.0	7.7	5.0	3.6	3.1	3.1	3.3	3.5
1,1-Dichloroethene	18	22	17	26	13	10	6.9	5.5	5.0	6.6
1,2-Dichloroethene[1]	U 2.0	101	U 2.0	U 2.0	52 E/U 2.0	46/U 2.0	22/U 2.0	25/U 2.0	20/U 2.0	26/U 2.0
Benzene	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 1.0	U 2.0	U 2.0	U 2.0	U 2.0
Chlorobenzene	3.7	3.7	3.0	4.1	3.0	3.0	2.9	2.5	2.4	2.5
Ethylbenzene	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0	U 1.0	U 2.0	U 2.0	U 2.0	U 2.0
Methylene Chloride	U 2.0	U 2.0	U 2.0	U 2.0	38	U 2.0	19 B	0.99 J	U 10	0.58 JB
1,2-Dichlorobenzene	U 10	NA	U 2.0	U 2.0	U 2.0	U 5.0	U 2.0	U 2.0	U 2.0	U 2.0
1,4-Dichlorobenzene	U 10	NA	U 2.0	U 2.0	U 2.0	0.67 J	U 2.0	U 2.0	U 2.0	U 2.0
Toluene	U 2.0	8.5	U 2.0	U 2.0	U 2.0	U 1.0	U 2.0	U 2.0	U 2.0	U 2.0
Xylenes[2]	2.2	2.8	U 4.0	U 2.6	U 2.0	U 2.0	U 2.0/U 2.0	U 2.0/U 2.0	U 2.0/U 2.0	U 2.0/U 2.0
Date Sampled	9/94	1/95	3/95	6/95	9/95	2/97	11/98	5/99	10/99	5/00

[1]9/95-5/00: cis/trans

[2]2/97-5/00: o/m,p

U - analyte not detected at the reported limit

B - analyte was detected in the laboratory method blank

J - analyte was detected above the instrument detection limit but below the analytical reporting limit

NA - parameter was not analyzed

E - concentration of analyte is estimated because it exceeded the calibration range

Shaded areas indicate Remediation Goal exceedances

Well: URS-1

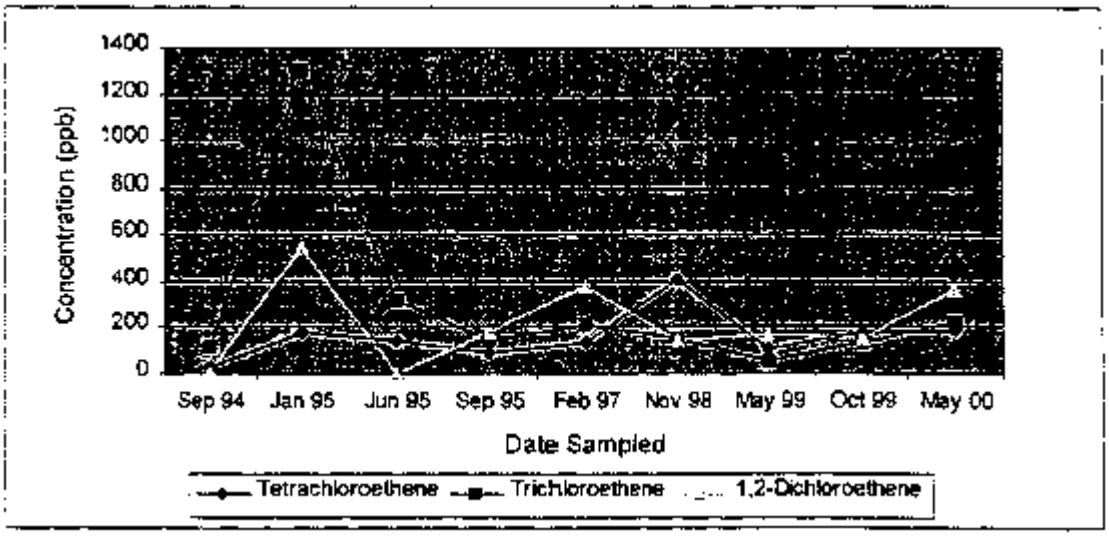

1400
1200
1000
800
600
400
200
0
Concentration (ppb)
Sep 94
Jan 95
Jun 95
Sep 95
Feb 97
Nov 98
May 99
Oct 99
May 00
Date Sampled
Tetrachloroethene
Trichloroethene
1,2-Dichloroethene

Table 22

Data Summary Table

Volatile and Semi-volatile Organic Compounds Concentrations (Fg/L)

-Well SW-1-

Tetrachloroethene	NA	NA	NA	NA	NA	U 2.0	0.43 J	U 2.0	U 2.0	U 2.0
Trichloroethene	NA	NA	NA	NA	NA	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0
1,1-Dichloroethene	NA	NA	NA	NA	NA	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0
1,2-Dichloroethene[1]	NA	NA	NA	NA	NA	U 3.0/U 2.0	0.95 J/U 2.0	U 2.0/U 2.0	U 2.0/U 2.0	U 2.0/U 2.0
Benzene	NA	NA	NA	NA	NA	U 1.0	0.58 J	U 2.0	U 2.0	U 2.0
Chlorobenzene	NA	NA	NA	NA	NA	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0
Ethylbenzene	NA	NA	NA	NA	NA	U 1.0	U 2.0	U 2.0	U 2.0	U 2.0
Methylene Chloride	NA	NA	NA	NA	NA	U 2.0	2.2 JB	1.2 J	U 10	U 5.0
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	U 5.0	U 2.0	U 2.0	U 2.0	U 2.0
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	U 2.0	U 2.0	U 2.0	U 2.0	U 2.0
Toluene	NA	NA	NA	NA	NA	U 1.0	U 2.0	2.8	U 2.0	U 2.0
Xylenes[2]	NA	NA	NA	NA	NA	U 1.0/U 1.0	U 2.0/U 2.0	U 2.0/U 2.0	U 2.0/U 2.0	U 2.0/U 2.0
Date Sampled	9/94	1/95	3/95	6/95	9/95	2/97	11/98	5/99	10/99	5/00

[1]9/95-5/00: cis/trans

[2]2/97-5/00: o/m,p

U - analyte not detected at the reported limit

B - analyte was detected in the laboratory method blank

J - analyte was detected above the instrument detection limit but below the analytical reporting limit

NA - parameter was not analyzed

APPENDIX D

List of Documents Reviewed

APPENDIX D

LIST OF DOCUMENTS REVIEWED

1. Site-Wide Remedial Investigation/Site Characterization Report, March 1988.
2. ROD for OU 1, September 1989.
3. ESD for OU 1, September 1993.
4. ROD for OU 2, June 1993.
5. ROD for OU 3/6, June 1993.
6. ROD for OU 4, April 1994.
7. ROD for OU 5, September 1990.
8. ROD Amendment for OU 5, September 1993.
9. Final Remedial Action Completion Report for OU 3/6, October 1994.
10. Remedial Action Completion Report for OU 5, October 1994.
11. Preliminary Site Closeout Report, September 1994.
12. Final Remedial Action Completion Report OU 1 and OU 4, September 20, 1995 and Appendix B Quality Assurance Report November 3, 1995.
13. Amendment # 4 to the Superfund State Contract for the Sand Creek Industrial Site; OU 1, OU 4, OU 5, effective June 24, 1995.
14. Applicable or Relevant and Appropriate Requirements Analysis for the Sand Creek Superfund Site, September 1995.
15. Five-Year Review Report, September 20, 1995.
16. Pollution Report (Polrep) Final revised November 15, 1995.
17. Final Close-Out Report, November 21, 1995.

18. Sand Creek Industrial Site Operable Unit IV, Semiannual Ground Water Summary Report, Colorado Department of Public Health and Environment, Commerce City, Colorado, October 9, 998; January 26, 999; April 3, 2000; August 7, 2000.

19. Operation and Maintenance Report, Remedial Design/Remedial Action, 48th and Holly Landfill, Harding Lawson Associates, Commerce City, Colorado, December 1997; June & December, 1998; June & December, 1999; June 2000.